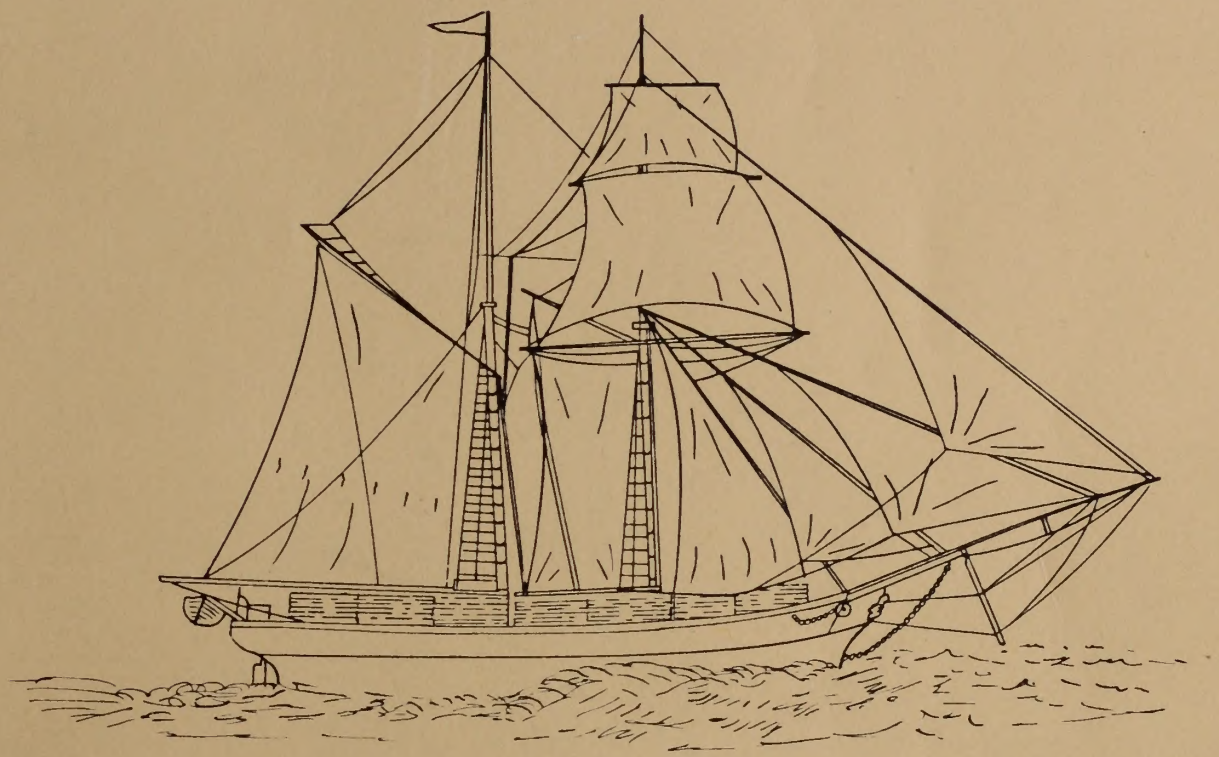
R. Michael Martin

SOUTH COAST-CURRY



Draft

TIMBER MANAGEMENT, EIS
ENVIRONMENTAL IMPACT STATEMENT

OREGON STATE OFFICE

IN REPLY REFER TO:

1792 (911.1)

United States Department of the Interior

BUREAU OF LAND MANAGEMENT

OREGON STATE OFFICE
P.O. Box 2965 (729 N.E. Oregon Street)
Portland, Oregon 97208

Enclosed for your review and comment is the Draft Environmental Impact Statement (DEIS) for timber management in the South Coast and Curry Sustained Yield Units. The purpose of the statement is to disclose the probable environmental impacts and to assure that these impacts are considered along with wildlife, economic, technical and other considerations in the decisionmaking process.

Comments concerning the adequacy of this statement will be considered in the preparation of the final environmental impact statement. The comment period will be 60 days from the date of transmittal to the U.S. Environmental Protection Agency. Written comments should be submitted by October 16, 1980. Public hearings on the draft statement will be held in Coos Bay, Oregon, on October 1 at the Coos Bay Library Auditorium. Details of the hearing will be announced through the public media.

If changes in response to public comment process are minimal, this draft would be incorporated into the final by reference only. The final would consist of public comments, responses to substantive comments, and any needed changes of the draft. Therefore, the draft should be retained for your use in conjunction with the final.

Comments received after the 60-day review period will be considered in the decision process, even though they may be too late to be specifically addressed in the final environmental impact statement. Additionally, one or more public meetings will be held after the Final EIS has been released but prior to making final management decisions.

Your comments should be sent to:

Oregon State Director (911.1)
Bureau of Land Management
P.O. Box 2965
Portland, Oregon 97208

Sincerely yours,

William D. Seavell

State Director

DEPARTMENT OF THE INTERIOR

DRAFT

ENVIRONMENTAL IMPACT STATEMENT

SOUTH COAST AND CURRY SUSTAINED YIELD UNITS

TEN-YEAR TIMBER MANAGEMENT PLAN

Prepared by

BUREAU OF LAND MANAGEMENT

DEPARTMENT OF THE INTERIOR

William E. Leonard

State Director, Oregon State Office

SOUTH COAST AND CURRY SUSTAINED YIELD UNITS PROPOSED TIMBER MANAGEMENT

Draft (x) Final ( ) Environmental Impact Statement

Department of the Interior, Bureau of Land Management

1. Type of Action: Administrative (x) Legislative ( )

2. Abstract: The Bureau of Land Management proposes to implement a 10-year timber management plan for the 326,372 acres of public land in the South Coast and Curry Sustained Yield Units of the Coos Bay District (Oregon). The proposed annual timber harvest is 34.47 million cubic feet (218 MM bd.ft.) from the 264,043 acre timber production base. Treatments specified by the proposal include harvest by clearcut and single tree selection methods, slash disposal, site preparation, planting of trees (including genetically improved stock), herbicide application, precommercial thinning, fertilization and road construction. Implementation of the proposed action would reduce annual timber harvest from the South Coast and Curry Sustained Yield Units by 2.43 million cubic feet (16 MM bd. ft.). Air quality would be adversely affected by particulates from slash burning. Adverse impacts to soil and water resources would be of a lesser magnitude than under the present program, but adverse site-specific impacts would still occur. Degree of impact on previously unidentified cultural resources is dependent upon success of pre-disturbance cultural resource surveys which are part of the proposal. Terrestrial wildlife would be impacted by a shift in habitat from a fairly even distribution of habitat classes to a forest where two successional stages predominate. The proposed action would cause a net loss of 81 jobs in the timber industry.

3. Alternatives analyzed:

(1) Emphasis on Timber Production.
(2) Emphasis on Timber Production Consistent with the Spotted Owl Management Plan.
(3) Emphasis on Non-Timber Values.
(4) No Control of Competing Vegetation with Herbicides.
(5) Forestry Program for Oregon.
(6) Lower Average Minimum Harvest Size.
(7) No Allowable Cut Effect.
(8) No Action.

4. The draft statement is expected to be filed with EPA and made available to the public on August 15, 1980. The comment period will be 60 days following transmittal to EPA.

5. For further information contact:

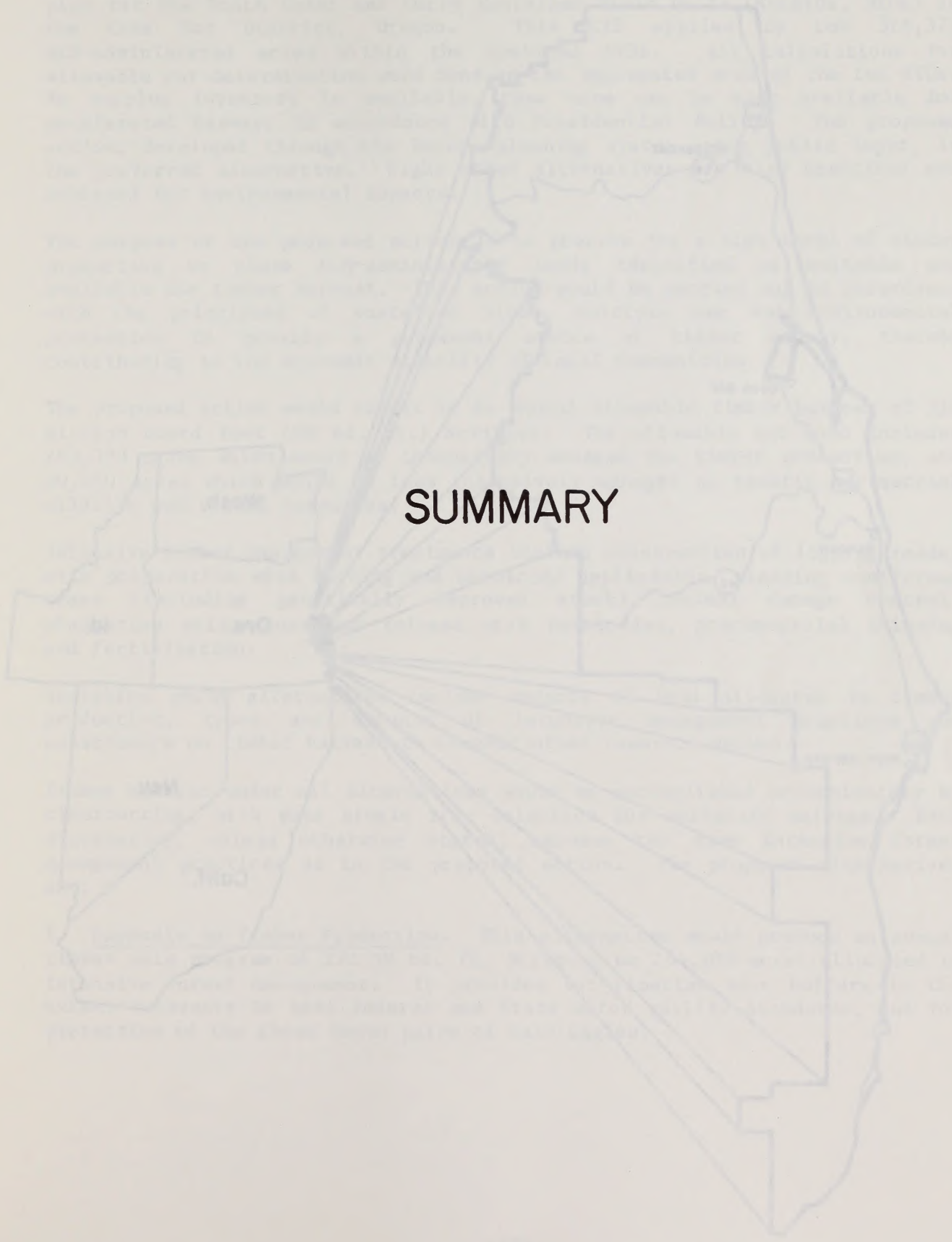
Richard Bonn, EIS Statement Leader
Bureau of Land Management
Oregon State Office
P.O. Box 2965 (729 N.E. Oregon Street)
Portland, Oregon 97208
Telephone: (503) 231-6953

Table of Contents

Tables

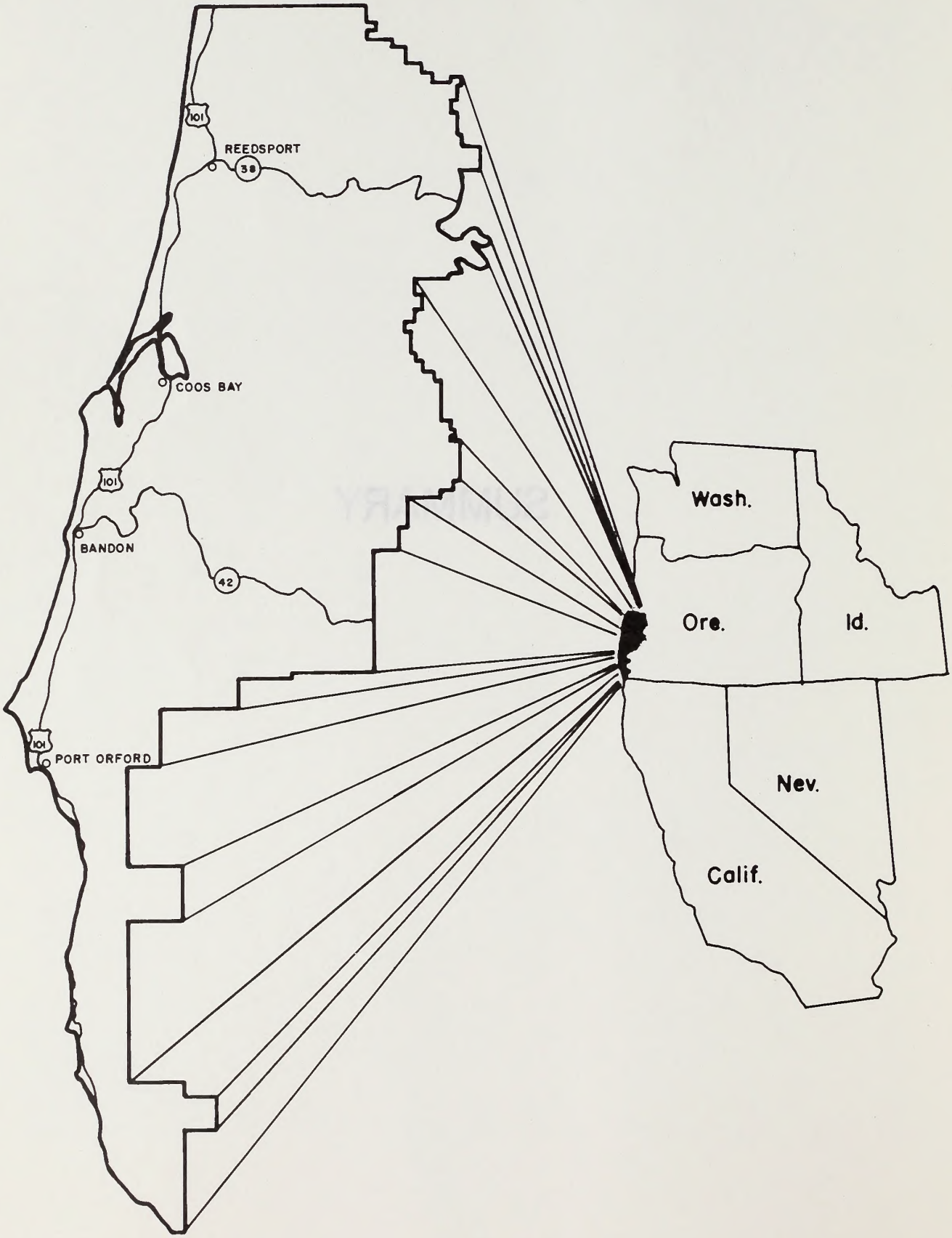
Figures

SUMMARY



VICINITY MAP

SOUTH COAST & CURRY EIS AREA



SUMMARY

This environmental impact statement (EIS) describes and analyzes the environmental impacts of implementing an updated 10-year timber management plan for the South Coast and Curry Sustained Yield Units (SCCSYUs, SYUs) in the Coos Bay District, Oregon. This EIS applies to the 326,372 BLM-administered acres within the combined SYUs. All calculations for allowable cut determination were done on the aggregated area of the two SYUs. No surplus inventory is available, thus none can be made available for accelerated harvest in accordance with Presidential Policy. The proposed action, developed through the Bureau planning system using public input, is the preferred alternative. Eight other alternatives are also described and analyzed for environmental impacts.

The purpose of the proposed action is to provide for a high level of timber production on those BLM-administered lands identified as suitable and available for timber harvest. This action would be carried out in accordance with the principles of sustained yield, multiple use and environmental protection to provide a permanent source of timber supply, thereby contributing to the economic stability of local communities.

The proposed action would result in an annual allowable timber harvest of 218 million board feet (MM bd. ft.) Scribner. The allowable cut base includes 203,393 acres which would be intensively managed for timber production, and 60,650 acres which would be less intensively managed to benefit terrestrial wildlife and visual resources.

Intensive timber management treatments include construction of logging roads, site preparation with burning and herbicide application, planting coniferous trees (including genetically improved stock), animal damage control, plantation maintenance and release with herbicides, precommercial thinning and fertilization.

Variables among alternatives include amounts of land allocated to timber production, types and amounts of intensive management practices and constraints on timber harvest to benefit other resource values.

Timber harvest under all alternatives would be accomplished predominately by clearcutting, with some single tree selection for mortality salvage. Each alternative, unless otherwise stated, assumes the same intensive forest management practices as in the proposed action. The proposed alternatives are:

1. Emphasis on Timber Production. This alternative would produce an annual timber sale program of 272 MM bd. ft. Scribner on 264,105 acres allocated to intensive forest management. It provides for riparian zone buffers to the extent necessary to meet Federal and State water quality standards, and for protection of the three known pairs of bald eagles.

2. Emphasis on Timber Production Consistent with the Spotted Owl Management. This alternative would produce an annual timber sale program of 251 MM bd. ft. Scribner on 245,296 acres allocated to intensive forest management, and 18,809 acres which will be less intensively managed to reflect the needs of 16 pairs of northern spotted owls. This is in addition to the eagle and riparian buffers identified in Alternative 1 above.

3. Emphasis on Non-timber Values. This alternative would produce an annual timber sale program of 150 MM bd. ft. Scribner. About 117,948 acres would be allocated to intensive timber production and 63,900 acres allocated for maintenance of visual quality. Approximately 66,149 acres, including the habitat of 25 pairs of spotted owls, would be managed primarily to benefit wildlife.

4. No Control of Competing Vegetation with Herbicides. This alternative utilizes the same production base as the proposed action and would produce an annual timber sale program of 203 MM bd. ft. Scribner. No herbicides would be used to control grass, brush or hardwood species growing in competition with commercial coniferous tree species. Control of vegetation for timber management by burning, grazing or using mechanical or manual means would be prescribed where economically feasible.

5. Forestry Program for Oregon. This alternative would provide the South Coast and Curry Sustained Yield Units' pro rata share of BLM timber harvest called for in the Forestry Program for Oregon (Oregon State Board of Forestry 1977). The State program calls for 228 MM bd. ft. Scribner per year in the next decade. It increases in the following decades until the SYUs' share reaches 265 MM bd.ft. Scribner per year in the sixth decade.

6. Lower Average Minimum Harvest Size. This alternative is identical to the proposed action except that the minimum average tree diameter in stands for final harvest would be smaller; i.e. from 16 inches average diameter breast height (dbh) under proposed action to 13 inches (dbh) under this alternative. This would result in an estimated annual timber sale program of 239 MM bd. ft.

7. No Allowable Cut Effect. This alternative would produce an annual timber sale program of 189 MM bd. ft. Scribner from 264,043 acres of timber land during the first decade. No credit would be taken for intensive management practices until gains in tree growth can be measured in future inventories.

8. No Action (No Change). This alternative specifies continuation of the present allowable cut of 234 MM bd. ft. Scribner. This alternative assumes continuation of the same management practices and constraints used in the 1972 allowable cut determination.

Environmental Consequences

Air Quality

Slash burning for the decade ranges from 31,800 acres under Alternative 3 to 50,094 acres with Alternative 1. Air quality could be impacted by

particulates up to a distance of 30-35 miles from the fire. Slash burning would increase total tons of particulates from 17 percent (Alternative 3) to 48 percent (Alternative 1) over those levels occurring during the past decade.

Soils

Road construction, yarding, slash burning and any activity that disturbs soil cover increases soil erosion. Erosion is greatest in the first year after disturbance, decreasing to background levels after 4 to 5 years. Total erosion in the SYUs is closely related to the number of acres disturbed, thus soil erosion is least for Alternative 3 and greatest for Alternative 8. Fewer roads and improved construction techniques along with new and improved yarding methods (full suspension systems) add up to less erosion for the proposed action and all alternatives when compared to the previous decade.

Water Resources

Cumulative sediments produced as a result of activities of the proposed action or any alternative except Alternative 1 would be expected to decrease from levels in the past decade. The range of decrease is 2 percent for Alternative 2 to 40 percent for Alternative 3. Sediment yield would increase 5 percent over past decade levels in Alternative 1. The amount of sediment produced depends on several factors such as proximity of disturbance to waterways, surface drainage, stream buffer widths, percent slope, climatic events and soil erodibility.

Except for Alternatives 1 and 2, water yield is expected to decrease from past decade levels. Decreases vary from 38 percent (Alternaitve 3) to 3 percent (Alternative 6). Alternatives 1 and 2 would increase water yield 10 percent and 2 percent, respectively.

Vegetation

Alterations to plant community structure and longevity would be the most significant impacts to terrestrial vegetation. These impacts are significant because they represent the long-term elimination of the majority of old-growth communities from high intensity management lands in the SCCSYUs.

Animals

The short-term impact would be the modification of habitat ranging from 23,380 to 41,773 acres depending on the alternative chosen. In this same time period, there would be a reduction in old-growth habitat ranging from 23 to 40 percent. A decline of similar magnitude in species that find their optimum habitat in old growth is possible. If any of the alternatives are carried out longer than two decades, there would be a major shift in wildlife habitat from a fairly even distribution of successional stages to a forest where only two successional stages predominate.

Currently there are 25 pairs of northern spotted owls known to occur on BLM-administered lands on the SCCSYUs. In accordance with the Oregon Endangered Species Task Force recommendations, BLM has agreed to protect a minimum of 16 pairs in the SYUs. The proposed action and Alternatives 2,4,5,6 and 7 are designed to meet this goal; Alternative 3 would protect all 25 pairs while Alternatives 1 and 8 make no provisions to do so.

Under the proposed action and most alternatives, approximately 50 percent of the identified big game survival cover would be eliminated after three decades. This could result in a 50 percent reduction in deer and elk in the event of an extremely harsh winter.

Increases in water yield could have an adverse impact in small areas, but a negligible one to the SYUs as a whole. Water temperatures are not expected to change. Overall, fish habitat has improved slightly in the last decade and this trend is expected to continue for the next decade under all alternatives.

Recreation

The impacts of timber management operations would be both beneficial and adverse, depending on the recreational experience desired. Visitor use increases or reductions may occur in certain areas as a result of impacts to specific recreational experiences. In the long term, total area-wide visitor use would not be significantly impacted under the proposed action or any alternative.

Cultural Resources

Appropriate measures would be taken to identify and protect cultural sites prior to ground-disturbing activities under the proposed action and all alternatives. Unidentified archeological sites would be susceptible to considerable alteration and damage. Once a site is found, however, mitigation measures will be instituted to ensure that any future damage is minimized or avoided.

Visual

Visual values would be severely degraded under Alternatives 1 and 2. Alternative 8 provides only minimal protection of some highly scenic visual resources. Alternative 3 calls for a high degree of protection for all highly scenic and/or visually sensitive visual resources. Under the proposed action and Alternatives 4,5,6 and 7, certain highly scenic and/or visually sensitive resources would be protected.

Ecologically Significant Areas

While timber harvest is not planned directly on sensitive sites, general impacts to the areas may be moderate depending upon degree of vegetative disturbance, soil compaction and erosion in proximity to the significant area.

Energy Use

Fossil fuel energy would be consumed in all phases of the 10-year timber management plan. The annual energy consumption ranges from 1.1 trillion Btu's (Alternative 3) to 1.9 trillion Btu's (Alternative 1). The annual energy consumption attributable to the proposed action would be approximately 1.6 trillion Btu's.

Socioeconomics

The proposed action would cause the net loss of 81 jobs in the timber industry. The loss of 96 jobs in logging and timber processing industries would be partially off-set by new jobs in forest management activities.

Alternative 3 would have the largest impacts, causing losses in total employment of 2.5 percent in Coos County and approximately 1 percent in Douglas County. Alternative 1 would cause a small net increase in employment.

School District 41 and the Port of Coquille would be affected by reductions of CBWR revenues. The cumulative impacts of the proposed action when combined with the impacts of timber harvest reduction in the Josephine SYU would reduce revenues to O&C Counties. Cumulative impacts of the alternatives would range from a 9.2 percent reduction for Alternative 3 to a slight increase (less than 0.5 percent) for Alternative 1.

CHAPTER I

DESCRIPTION OF ALTERNATIVES INCLUDING THE PROPOSED ACTION

CHAPTER 1 DESCRIPTION OF ALTERNATIVES INCLUDING THE PROPOSED ACTION

PURPOSE AND NEED

The Bureau of Land Management (BLM) proposes to implement, beginning October 1, 1981, an updated 10-year timber management plan for the South Coast and Curry Sustained Yield Units (SCCSYUs, SYUs) in the Coos Bay District, Oregon (Figure 1-1, folded maps in the back cover pocket). These are primarily Revested Oregon and California Railroad (O&C) and Reconveyed Coos Bay Wagon Road (CBWR) lands. In accordance with the National Environmental Policy Act (NEPA), this EIS identifies impacts on the natural and human environment associated with the proposed action and alternatives. The 10-year timber management plan for the two SYUs provides direction for management of these lands as required by the acts mentioned below.

The Bureau's principal authority and direction to manage the O&C and CBWR grant lands is found in the O&C Act of 1937 (50 stat. 874; 43 U.S.C. 1181a., et seq.). The disposition of funds derived from the CBWR grant lands is described in an act approved on May 24, 1939 (43 USC 1181f-1 et seq.). Under these acts, O&C and CBWR lands classified as timberlands are to be managed under sustained yield principles in order to provide a permanent source of timber supply, watershed protection, stream flow regulation and recreation. Intermingled public domain lands were brought under sustained yield management principles by the Bureau's 1969 application to withdraw these lands from entry under all public land laws except certain disposal acts. Withdrawal was completed by Public Land Order 5490 (40 FR 7450 (1975)). In addition, many activities of the BLM are governed by the Federal Land Policy and Management Act of 1976 (90 Stat. 2743, 43 U.S.C. 1701). This law, often referred to as BLM's "Organic Act" or FLPMA, established policy for BLM administration of public lands under its juridsiction.

Notwithstanding any provision of FLPMA, in the event of conflict with or inconsistency between FLPMA and the O&C Act of August 28, 1937 (50 Stat. 874; 43 U.S.C. 1181a-1181j), and the Act of May 24, 1939 (43 USC 1181f-1 et seq.), insofar as they relate to management of timber resources and disposition of revenues from lands and resources, the latter Acts shall prevail.

The recommended land use plan prepared for the SYUs identifies proposed timber harvest levels, management practices and mitigating measures to protect the land and other resources. For purposes of study and comparison between alternatives, the Coos Bay District Manager has recommended a proposed action. The proposed action, the preferred alternative for the purpose of analysis, was developed through the Bureau Planning System using public input. No decision on the specific action to be taken shall be made until after public review and comment have been completed and the final EIS has been issued.

PROPOSED ACTION AND ALTERNATIVES

Planning for the two SCCSYUs focused on the 326,372 acres administered by BLM. These lands are widely dispersed over portions of Coos, Curry, Douglas and Lane Counties in a aggregate area of 1,917,874 acres (Table 1-1).

Table 1-1 Land Jurisdiction in Acres [1/] by County within South Coast and Curry Sustained Yield Unit

County	BLM[2/]	USFS	Other[3/] Federal	State	Local Government	Private	Total
Lane	635	27,297	0	239	250	23,063	52,484
Douglas	128,925	64,798	121	36,744	3,470	300,357	534,415
Coos	164,901	8,454	2,589	64,898	14,029	683,394	938,265
Curry	31,911	40,168	0	10,287	1,220	310,124	393,710
Totals	326,372	140,717	2,710	112,168	18,969	1,316,938	1,917,874

1/ Acreage figures for BLM-administered lands are derived from master title plats. Other acreage figures are BLM estimates.

2/ O&C lands and CBWR lands comprise 67 percent and 18 percent, respectively, of the public lands administered by BLM. The remaining 15 percent are Public Domain lands.

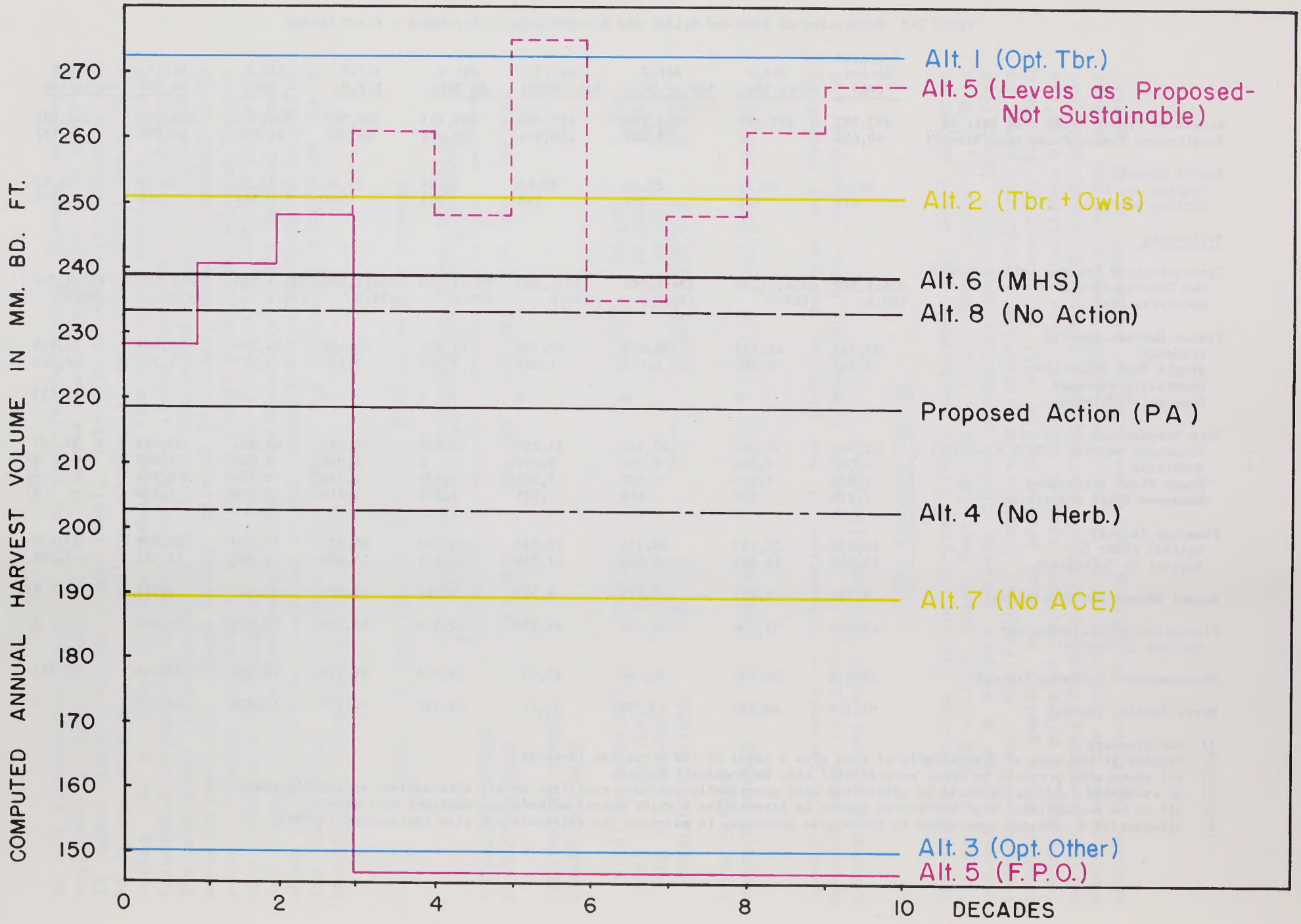
3/ Includes U.S. Army Corps of Engineers, U.S. Coast Guard, U.S. Navy and U.S. Fish and Wildlife Service lands and BLM lands administered by Coos County (Parks and Recreation Department).

There are nine alternatives including the proposed action for which impacts will be analyzed in Chapter 3:

Proposed Action (PA)

1. Emphasis on Timber Production (Opt. Tbr.)
2. Emphasis on Timber Production Consistent with the Spotted Owl Management Plan (Tbr. + Owls)
3. Emphasis on Non-Timber Values (Opt. Other)
4. No Control of Competing Vegetation with Herbicides (No Herb.)
5. Forestry Program for Oregon (F.P.O.)
6. Lower Average Minimum Harvest Size (MHS)
7. No Allowable Cut Effect (No ACE)
8. No Action (No Change)

For each alternative, a sustained yield harvest level (allowable cut) has been calculated based on the combined timber production base of the two SYUs. (Figure 1-2). All allowable cut computations are made in cubic feet and converted to Scribner board feet equivalence for the first decade. There is no surplus inventory (see Glossary). Thus, none can be made available for accelerated harvest in accordance with Presidential policy. Variables between alternatives include amounts of land allocated to timber production, types and amounts of intensive management practices and constraints on timber harvest to benefit other resource values. These relationships are displayed in Table 1-2.



SUSTAINABLE HARVEST LEVELS OF ALTERNATIVES AND PROPOSED ACTION BY DECADE

Table 1-2 Comparison of Proposed Action and Alternatives by Treatment - First Decade

	Proposed Action (PA)	Alt.1 Opt.Tbr.	Alt.2 Tbr. + Owls	Alt.3 Opt. Other	Alt.4 No Herb.	Alt.5 F.P.O.	Alt.6 MHS	Alt.7 No ACE	Alt.8 No Action
Intensive Timber Production Base 1/	203,393	264,105	245,296	117,948	203,393	203,393	203,393	203,393	260,875
Constrained Timber Production Base 1/	60,650	0	18,809	130,049	60,650	60,650	60,650	60,650	6,937
Annual Harvest									
Million cu. ft.	34.47	42.84	39.60	23.67	32.05	35.96	37.71	29.76	36.90
Million bd. ft.	218	272	251	150	203	228	239	189	234
Treatments									
Transportation System, (miles;acres)									
New Construction 2/	234;1,500	234;1,500	234;1,500	150;1,000	234;1,500	234;1,500	234;1,500	234;1,500	477;2,964
Reconstruction	189;0	189;0	189;0	189;0	189;0	189;0	189;0	189;0	189;0
Timber Harvest (acres)									
Clearcut	33,743	41,773	38,658	23,380	31,495	35,129	36,760	29,668	34,639
Single Tree Selection (mortality salvage)	3,377	4,390	4,003	1,585	3,377	3,377	3,377	3,377	18,282
Commercial Thinning	0	0	0	0	0	0	0	0	17,853
Site Preparation 3/ (acres)									
Broadcast Burning (slash disposal)	42,966	50,094	47,322	31,800	40,830	44,283	45,832	39,095	35,707
Herbicide	9,000	9,000	9,000	9,000	0	9,000	9,000	9,000	6/
Brush Field Conversion	6,834	7,109	7,109	5,251	6,834	6,834	6,834	6,834	6/
Hardwood Stand Conversion	1,276	500	688	1,528	1,276	1,276	1,276	1,276	6/
Planting (acres)									
Initial plant 4/	44,653	52,182	49,255	32,969	42,405	46,039	47,670	40,578	37,439
Replant or Interplant	14,740	16,622	15,890	11,819	14,178	15,086	15,494	13,721	9,888
Animal Damage Control (acres)	9,527	9,527	9,527	9,527	9,527	9,527	9,527	9,527	6/
Plantation Maintainence and Release 5/ (acres)	43,650	51,150	48,150	34,650	2,810	45,150	46,450	40,650	6/
Precommercial Thinning (acres)	28,976	32,631	30,160	17,837	28,976	28,976	28,976	28,976	10,761
Fertilization (acres)	42,550	46,205	43,734	31,411	42,550	42,550	42,550	42,550	0

1/ See Glossary
2/ Figured at the rate of 6 acres/mile of road plus a total of 100 acres for landings.
3/ All acres site prepared by other methods will also be broadcast burned.
4/ An estimated 7,875 acres would be reforested with genetically improved seedlings on all alternatives except Alternative 4.
5/ All to be accomplished with herbicides except in Alternative 4 where manual methods are employed exclusively.
6/ Alternative 8 contains treatments to the degree necessary to maintain the allowable cut plan implemented in 1972.

In all alternatives except 6 and 8, the minimum average diameter of trees available for final harvest in the intensive timber production base would be 16 inches diameter breast height (dbh). This size is normally reached at age 50 in the SCCSYUs. In actuality, harvest at this size would occur only during two or three decades throughout the 400 year projection period (described in Appendix A) since the oldest timber would be harvested first. The most usual circumstance, as the forest approached a regulated condition, would be a minimum average harvest size of 25 inches, normally reached in 80 years. On areas allocated to constrained timber production, minimum harvest ages (MHA) vary to recognize specific needs for wildlife habitat diversity and visual resource management (VRM) considerations. All harvest levels shown in Table 1-2 are computed on the respective combinations of intensive and constrained timber production bases. The following tabulation is a breakdown by category and alternative.

Table 1-3 Derivations of Timber Production Base Acreage

	Alternatives Including the Proposed Action				
	PA,4,5,6&7	1	2	3	8
INTENSIVE TIMBER PRODUCTION BASE	203,393	264,105	245,296	117,948	260,839
CONSTRAINED TIMBER PRODUCTION BASE					
Wildlife (MHA-350)	36,508	-	18,809	66,149	4,256
VRM II (MHA-160)	4,118	-	-	24,900	2,681
VRM III (MHA-80)	20,024	-	-	39,000	-
TOTAL CONSTRAINED	60,650	0	18,809	130,049	6,937
TOTAL TIMBER PRODUCTION BASE	264,043	264,105	264,105	247,997	267,812

Appendix A presents a discussion of the planning process and inventory methods used to arrive at the timber production base, allowable cut determination and other land use allocation.

The Proposed Action

The proposed action for the 10-year timber management plan would permit a harvest of 218 million board feet (MM bd.ft.) of timber annually. This proposal seeks a balance between timber production and other identified resource values. The proposal incorporates protection of riparian zones to benefit water quality and fish production as well as protection for bald eagles and 16 pairs of northern spotted owls. It also establishes wildlife habitat corridors (Figure 1-3) which provide for a diversity of habitats that would assure the continuation of the existing animal communities and prevent genetic isolation. Objectives for visual quality management of all public

lands would be established. Four VRM classes (Glossary) specify objectives and allow for differing degrees of modification in the basic elements (form, line, color, texture) of landscape features. Figure 1-4 shows the proposed VRM class delineations for the SCCSYUs.

A sample 5-year timber sale plan for the SCCSYUs has been prepared by the Coos Bay District for illustrative purposes only (Appendix B). The timber sale program for the remaining 5 years is expected to be comparable. This plan contains preliminary estimates of the volume to be harvested, miles of road to be constructed, harvest systems to be employed, acres of slash to be burned, average slope and soil association types to be affected within each sale area. Since many of the timber sale areas (especially fiscal years 1983 through 1986) have not been field checked, the information is subject to change during preparation of annual timber sale plans.

Alternative 1 - Emphasis on Timber Production

This alternative would produce an annual timber sale program of 272 MM bd. ft. It provides for the protection of three pairs of bald eagles and riparian buffer zones to the extent necessary for meeting Federal and State legal water quality standards. Existing recreation areas would be retained. There would be no commercial forest land allocated for visual resource management and communication site expansion or for specific management of wildlife other than eagles.

Alternative 2 - Emphasis on Timber Production Consistent with the Spotted Owl Management Plan

Alternative 2 would produce an annual timber sale program of 251 MM bd. ft. This alternative differs from Alternative 1 in that an additional 18,809 acres would be managed for protection of the northern spotted owl. Habitat for 16 pairs would be provided for in accordance with the criteria set forth in the spotted owl management plan prepared by the Oregon Endangered Species Task Force. (See discussion in Chapter 3 Impacts on Animals, Threatened and Endangered Animals.) All other aspects of the alternative would be the same as Alternative 1.

Alternative 3 - Emphasis on Non-Timber Values

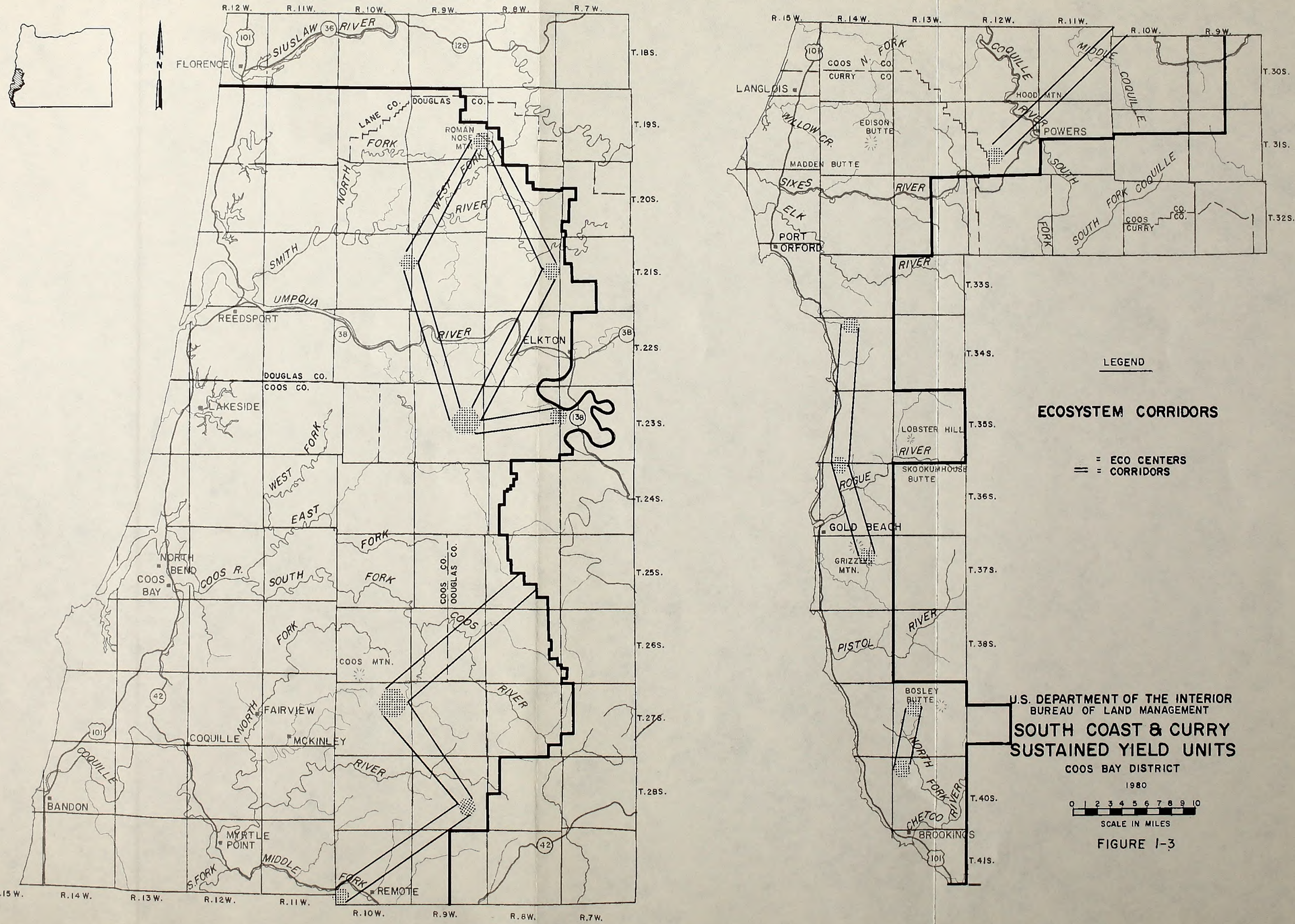
This alternative, which would produce an annual timber sale program of 150 MM bd. ft., differs from the proposed action in that non-timber resource values would receive primary emphasis. Therefore, 66,149 acres for wildlife ecosystem management and 63,900 acres for visual resource management would be allocated to the constrained timber production base acreage. All other management practices and constraints would remain the same as described in the proposed action.

Alternative 4 - No Control of Competing Vegetation with Herbicides

This alternative is the same as the proposed action in timber base and treatments, except that herbicides would not be used to control grass, brush

NORTH HALF

SOUTH HALF



LEGEND

ECOSYSTEM CORRIDORS

= ECO CENTERS

= CORRIDORS

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SOUTH COAST & CURRY SUSTAINED YIELD UNITS

COOS BAY DISTRICT

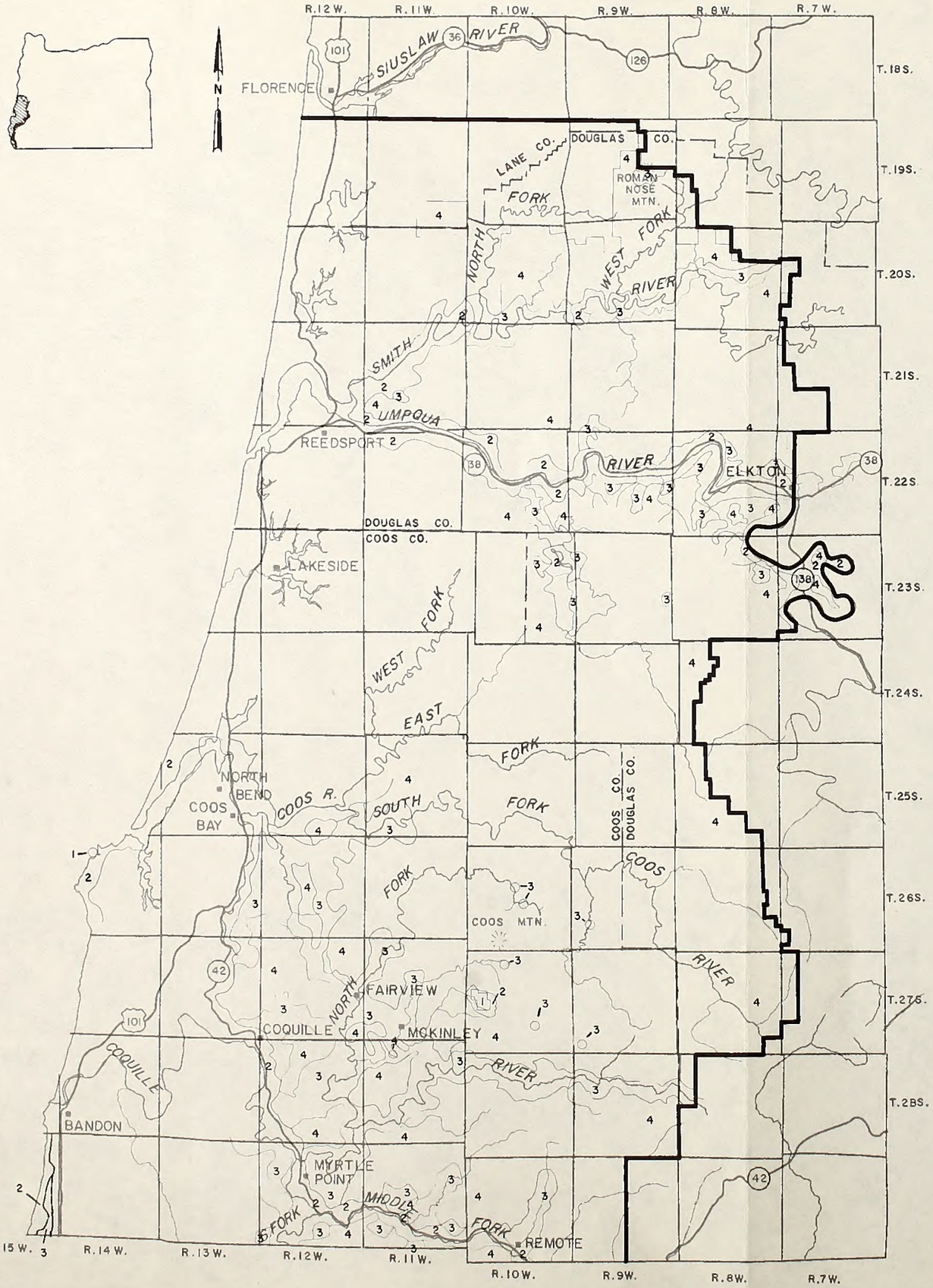
1980

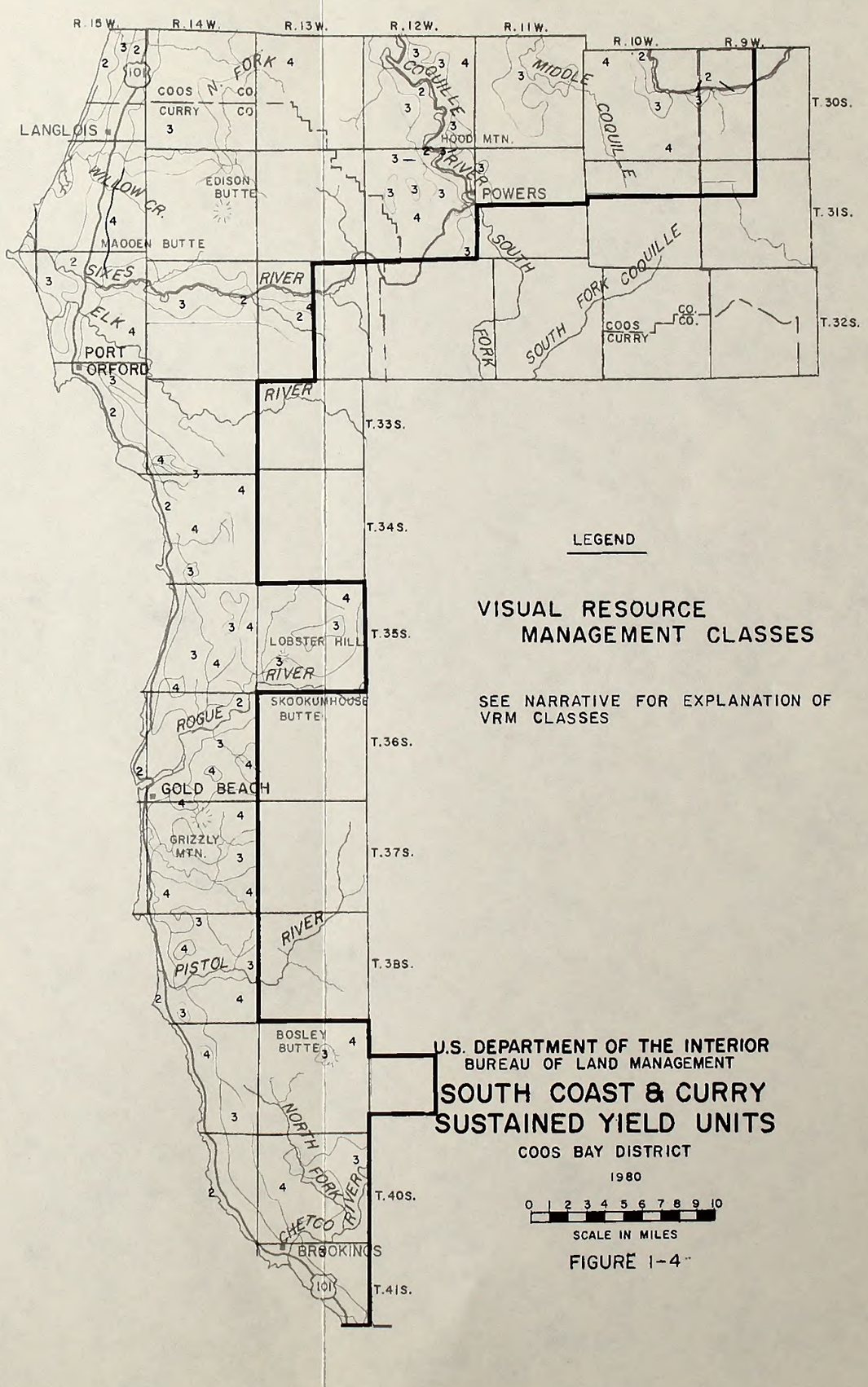
0 1 2 3 4 5 6 7 8 9 10
SCALE IN MILES

FIGURE 1-3

NORTH HALF

SOUTH HALF





LEGEND

VISUAL RESOURCE MANAGEMENT CLASSES

SEE NARRATIVE FOR EXPLANATION OF VRM CLASSES

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SOUTH COAST & CURRY SUSTAINED YIELD UNITS

COOS BAY DISTRICT

1980

0 1 2 3 4 5 6 7 8 9 10
SCALE IN MILES

FIGURE 1-4

and hardwood species growing in competition with commercial coniferous tree species. This would eliminate herbicide treatments for the control of competing vegetation prior to reforestation (site preparation), during establishment (stocking maintenance) and after young stands become established (release). Control of vegetation for timber management by using biological, mechanical or manual means would be prescribed to approximately the same dollar level of investment as would be used for herbicides in the proposed action to provide a means of direct comparison between the two alternatives. This investment would be applied only for release under Alternative 4, whereas for other alternatives the investment is for site prep, maintenance and release.

Under this alternative, it is estimated that the annual timber sale program would be 203 MM bd. ft., 7 percent less than the proposed action for the first decade. Continuation of the "no herbicides" alternative beyond the first decade would be expected to result in an increasing reduction in future potential timber productivity. Eight decades in the future, productivity would be approximately 35 percent less than that realized from continuation of the proposed action.

An assumption has been made that the difference in timber production between the two alternatives could possibly be narrowed by greater investments in manual and mechanical methods. However there is some question about the cost effectiveness of continued manual and mechanical treatments on a given site. Levels of investment will be addressed in the Record of Decision which is prepared after the final EIS.

Alternative 5 - Forestry Program for Oregon

This alternative would provide the South Coast and Curry Sustained Yield Units' pro rata share of BLM timber harvest called for in the Forestry Program for Oregon (Oregon State Board of Forestry 1977).

This share would be harvested using the same allowable cut base and subject to the same management constraints to protect wildlife and visual values as the proposed action. The State program calls for the BLM timber harvest volumes in the SCCSYUs over the next 10 decades listed below:

Decade Starting	Annual Harvest Volume MM bd. ft.	MM cu. ft.
1980	228	34
1990	241	36
2000	248	37
2010	261	39
2020	248	37
2030	275	41
2040	235	35
2050	248	37
2060	261	39
2070	268	40

Analysis of this alternative will determine the capacity of the SYUs to meet the share target.

Alternative 6 - Lower Average Minimum Harvest Size

This alternative is identical to the proposed action except for the minimum harvest size (MHS). Timber stands available for final harvest would have an average size of 13 inches dbh, which is normally reached in 40 years. This would result in an estimated annual timber sale program of 239 MM bd. ft., 21 MM bd. ft. more than the proposed action which uses an average dbh of 16 inches. A regulated forest on intensive timber production land would be reached in about the 14th decade (2121) in contrast to the 8th decade (2061) under the proposed action. It is estimated that at the time a regulated forest is achieved, the annual harvest level from the lands allocated to timber production under the proposed action could be increased gradually to the highest level sustainable, approximately 370 MM bd. ft.

Alternative 7 - No Allowable Cut Effect

The same allowable cut base, management practices and constraints used for the proposed action are used for this alternative. The difference is that credit for expected yields from intensive timber management practices (genetically improved stock, fertilization, precommercial and commercial thinnings) would not be taken until gains in tree growth are realized in future inventories. The annual timber sale program would be 189 MM bd. ft.

Alternative 8 - No Action (No Change)

This alternative constitutes a continuation of the present allowable cut (234 MM bd. ft.) which is 16 MM bd. ft. more than the proposed action (218 MM bd. ft.). Continuation of the same management practices and constraints used in the 1972 allowable cut calculation is assumed. Other management practices and constraints in the proposed action would not be considered under this alternative.

Alternatives Identified But Not Considered

During the scoping meeting held in Coos Bay, the public was requested to identify alternatives to be addressed in this EIS. In addition to those incorporated for analysis, an alternative was suggested which would incorporate all of the elements of Alternative 3 and in addition provide for the maximum obtainable numbers of big game animals. This would require rigid scheduling of timber harvest and spacing of clearcuts, resulting in an annual allowable cut of 115 MM bd. ft., which is 35 MM bd. ft. less than that in Alternative 3. This additional spacing requirement would not be a reasonable alternative given the expected economic and social impacts on the local community and surrounding area.

Another suggested alternative that is not being analyzed is to calculate an allowable cut for all timber ownerships in the region embracing the South

Coast and Curry Sustained Yield Units, and allocate a pro rata portion of that to BLM-administered lands. A joint decision by several parties would be required to implement this alternative and the underlying concept is provided for in Alternative 5 (Forestry Program for Oregon).

FOREST MANAGEMENT TREATMENTS AND DESIGN ELEMENTS

Table 1-2 displays, in typical sequence, the levels of treatments for each alternative including the proposed action. Following harvest, by clearcut or single tree selection, the sequence of treatments reflects those actions necessary to facilitate prompt reforestation of the specific tract and subsequent growth of commercial coniferous species. The following discussion of treatments will be in the same order as listed in Table 1-2.

Not every treatment listed in Table 1-2 would be applied to every acre. A number of treatment combinations are possible and could be employed. The purpose of this section is to elaborate on what each treatment entails and quantify the magnitude of the actions. Treatments would be identified and scheduled through application of the Operations Inventory System (Appendix A). Determination of treatment needs for those actions to be required in the sales contract would be made during timber sale planning.

Contracts, usually awarded on a competitive basis, are the means of accomplishing all timber harvest and many forest development practices. The standard and special provisions (which include mitigating measures) in a contract set forth the performance standards to be followed by the contractor in carrying out the action in accordance with applicable laws, regulations and policies. In contract preparation, selection of special provisions is governed by the scope of the action to be undertaken and the physical characterisitics of the specific site. The standard provisions of the basic timber sale contract, Bureau Form 5450-3, are applicable for all timber sales. Bureau manuals and manual supplements provide a variety of approved special provisions for use, as appropriate, in individual contracts. The combination of selected special provisions constitutes Section 41 of the timber sale contract (Form 5450-3).

Prior to any vegetative or ground manipulation, BLM requires a survey of the project site for plants and animals listed or proposed for listing on Federal and official State lists of threatened and endangered species. If a project might affect any listed or proposed threatened or endangered species or its critical habitat, every effort would be made to modify, relocate or abandon the project in order to obtain a no effect determination. If BLM determines that a project cannot be altered or abandoned, consultation with the U.S. Fish and Wildlife Service would be initiated (50 CFR 402; Endangered Species Act of 1973, as amended).

Whenever evidence of historic or prehistoric occupation is identified during BLM activities, special surveys are undertaken to determine possible conflicts in management objectives. In addition, a Class III (complete) cultural resources inventory is required on all areas to be subjected to ground manipulation activities. This is accomplished in the pre-planning

stage of a treatment and the results analyzed in the environmental assessment addressing the action (BLM Manual 8100, Cultural Resources Management). When a cultural resource is discovered during a timber harvest or associated activities, operations in proximity are immediately suspended and may only resume upon receipt of written instructions from the authorized BLM officer.

The BLM monitors forest management practices primarily through administration of the contracts under which most actions are authorized. Timber sale contracts are inspected at least once a week, when active, and more often if sensitive operations are in progress. Daily administrative visits are not uncommon when harvest is moving at a fast pace, slash disposal is occurring, or road construction involving critical aspects (such as stream crossing structures) is taking place. Service contracts, i.e., tree planting, precommercial thinning, tubing, manual brush cutting and fertilization, are monitored at regular intervals to determine the quality and quantity of completed work. Visits to these operations range from twice a week to the full-time presence of a Bureau contract administrator, depending on the experience of the contractor and rate of progress. Daily visits usually occur when there is reason to believe that the operator will require help in the interpretation of contract requirements.

Studies would be conducted during all resource management activities. Water quality monitoring would be initiated in accordance with Executive Orders 11991 and 12088, BLM Manual 7240, and Sections 208 and 313 of the Clean Water Act (P.L. 95-217, P.L. 92-500 as amended). Standard analytical methods as detailed in Federal directives would be followed.

Studies would be established in representative riparian zones to determine changes in the habitat conditions and populations of fish and wildlife resulting from implementation of any alternative. Such monitoring would comply with Executive Orders 11514 and 11990 and BLM Manual 6740.

Transportation System

Oregon Manual Supplement, Release 5-115 of April 10, 1975, would be used in preparing road construction requirements for timber sale contracts. All engineering terminology and types of construction equipment are defined in the manual supplement and specifications for all aspects of construction, reconstruction and surfacing are provided.

Methods of slope protection are provided to avoid collapse of cut-and-fill embankments. Specifications for rock pits and quarries include provisions for minimum visual intrusion, drainage and control of runoff and restoration following use.

Special stipulations are provided for the installation of stream crossing structures, such as corrugated metal culverts, so that fish passage is not impeded. These measures may include imposing gradient limitations for the structures and/or installing baffles to reduce water velocity through the culverts.

One section of the manual supplement provides design features to control and minimize erosion during road construction and throughout the design life of the road. Another section addresses soil stabilization practices including planting, seeding, mulching and fertilizing for establishment of soil binding vegetation.

Since portions of the existing road system are underdesigned, obsolete or unsafe, approximately 189 miles of road would be reconstructed during the 10-year period for the proposed action and all alternatives. On the average, an estimated 23.4 miles of new, permanent road would be constructed annually, during the decade, for the proposed action and alternatives 1, 2, 4, 5, 6, and 7. Alternatives 3 and 8 would need the annual construction of an estimated 15 and 47.7 miles of new road, respectively. It is estimated that 417 miles (2,500 additional acres) of road is necessary to largely complete the SYUs' permanent road system for the proposed action and all alternatives except 3 and 8. Therefore, it is assumed that the permanent road system would not be completed until the end of the second decade. Construction standards, i.e., stream crossing, subgrade width, ditch, cut-and-fill slope requirements, and type of surfacing would be determined during the annual timber sale planning process. Basic construction operations as well as a brief history of transportations systems are described in detail in the programmatic environmental impact statement BLM prepared on timber management in the western United States (USDI, BLM 1975), hereafter referred to as the BLM Timber Management FEIS.

Timber Harvest

The primary timber harvest method to be employed during the 10-year period is clearcutting. It is estimated that 83 percent of the proposed harvest in the SYUs would be accomplished by cable yarding systems. Another 10 percent would be accomplished by "full suspension" cable yarding systems and the remaining 7 percent by aerial yarding systems (helicopter or balloon). Although no final harvest acreage is planned, tractor skidding would be the system used when clearing road right-of-ways and immediate landing areas. This variety of logging systems is a design feature employed primarily for watershed protection and reduced soil damage. Refer to the BLM Timber Management FEIS for a detailed description of logging systems.

Timber harvesting limitations pertaining specifically to clearcutting, as identified in the Church Report (U.S. Congress, Senate 1972), have been adopted by BLM. These limitations are incorporated in the Oregon Manual Supplement 5424, which lists special provisions or stipulations for use in the logging requirements portion of a timber sale contract.

Single tree selection would be employed for mortality salvage of dead and dying timber. Mortality salvage (to utilize a commercial product that would otherwise be lost) would occur in stands not scheduled for harvest within the 10-year plan period. Mortality salvage would also occur on lands not included in the total timber production base in the event of a major catastrophic event.

Proposed final timber harvest acreages for the alternatives range from a maximum of 41,773 acres (Alternative 1) to a minimum of 23,380 acres (Alternative 3). The variance in the single tree selection acreage for mortality salvage reflects the differences in harvest age timber available for each alternative.

Commercial thinning would normally be applied at 10 year intervals in 30-70 year old intensively managed stands. Considering the existing stand composition, this treatment would not be scheduled until the third decade (assumming continuation of the 10- year plan) for the proposed action and all alternatives except Alternative 8. Commercial thinning of previously untreated stands would be is included in the first 10 years under Alternative 8.

Site Preparation

Site preparation procedures are used to prepare newly harvested and inadequately stocked areas for the planting of a new crop of trees. Four types of site preparation treatments (broadcast burning, herbicides, and brush field and hardwood conversion) are planned within the SYUs for the proposal period.

The main site preparation treatment would be broadcast burning to control competing vegetation, provide planting site accessibility and reduce the fire hazard. Burning would only occur at times approved by the Oregon State Department of Forestry which administers the Smoke Management portion of the State's Air Quality Implementation Plan. For each alternative, acreage requiring slash disposal by broadcast burning (Table 1-2) includes up to 95 percent of the lands proposed for clearcutting, all brush field and hardwood conversion lands and 2,800 inadequately stocked backlog acres. Brush field acreage conversion would be accomplished by hand slashing in preparation for burning. Hardwood stand conversion acreages would be harvested for additional utilization of wood value, then burned.

Site preparation treatment using herbicides (Table 1-4) is included in all alternatives except Alternative 4. Herbicides are used to increase plantation survival rate by control of grasses, forbs, brush and noncommercial tree species.

These treatments improve the potential for success by reducing competition for light, moisture and soil nutrients during the tree seedling establishment period. Application and monitoring of herbicides would be in accordance with BLM FEIS Vegetation Management with Herbicides:Western Oregon 1978 through 1987. See Plantation Maintenance and Release, (Page 1-18) for more detail.

Planting

To achieve adequate reforestation within 5 years following harvest on timber production lands, harvested areas would be planted with commercial coniferous species within 1 year of the completion of harvesting. Planting stock is nursery grown from seed collected on sites and at elevations similar to the

Table 1-4 Estimated Ten-Year Use of Herbicides Based on Proposed Action Acreage

Chemical	Application Rate (lbs./Acre)	Active Ingredients (Total lbs.)	Method	Season	Carrier	Estimated Acres	Target Species
SITE PREPARATION							
Roundup (glyphosate)	3.0	3,600	Aerial	Late Summer	Water	1,200	Salmonberry, Hazel, Thimbleberry.
Tordon K - Verton 2D (picloram - 2,4-D)	5.0	33,000	Aerial	Early Summer	Water	6,600	Tanoak, Bigleaf Maple, Salmonberry
Tordon 101R (picloram)	0.5	600	Hand	All Seasons	Undiluted	1,200	Bigleaf maple (cut stumps)
STAND RELEASE							
2,4-D	2.0	17,006	Aerial	Summer	Water & Diesel	8,503	Red Alder, Tanoak, Madrone, Ceanothus, (mixed hardwoods)
2,4-D	3.0	18,765	Aerial	Spring	Water & Diesel	6,255	Red Alder, Tanoak, Madrone, Ceanothus, (mixed hardwoods)
Roundup (glyphosate)	1.5	42,279	Aerial	Late Summer	Water	28,186	Salmonberry, Hazel, Thimbleberry
Krenite	3.0	8,118	Aerial	Late Summer	Water	2,706	Red Alder, Vine Maple, Blackberry

specific project area. Genetically improved stock is also being nursery grown and would be scheduled for planting on 7,875 acres. The broad selection of parent trees for genetically improved stock would maintain genetic diversity (BLM Instruction Memorandum OR 79-334).

At present an estimated backlog of 6,376 acres within the timber production base are nonstocked or stocked below minimum acceptable levels of seedlings per acre (Oregon Manual Supplement 5705). In addition, reforestation experience in the SCCSYUs shows that target stocking levels of 245-320 trees per acre depending on site class cannot always be achieved by the initial planting. It is estimated that 25 percent of the initial units planted annually would require replanting or interplanting during the proposal period. Post-treatment surveys would be conducted to determine the rate of survival, and when replanting or interplanting would be required to meet stocking standards.

Animal Damage Control

An estimated 9,527 acres would require some type of protective treatment from animal damage during the proposal period for each alternative, including the proposed action. Planned treatments include placing plastic tubing or netting over seedlings to protect them from browsing by deer, elk, mountain beaver or other small animals. Mountain beaver would be trapped when they occur in significant numbers in a plantation. Seed orchards and progeny test sites (see Glossary) would be fenced. The total number of acres requiring each of these treatments would be determined in conjunction with normal reforestation surveys.

Plantation Maintenance and Release

Maintenance treatments promote the survival and establishment of coniferous seedlings. Release treatments reduce competition for light, moisture and nutrients between shrubs or grass and existing commercial coniferous seedlings and promote dominancy and growth of established coniferous trees. Fast-growing hardwoods, such as red alder or vine maple, overtop and suppress slow-starting conifer seedlings. The degree and type of competition varies with the individual site. On dry sites, grass competes effectively for water, while elsewhere hardwoods grow rapidly enough to shut out essential light and compete for water during the dry summer. With reduced competition, the conifers rapidly grow beyond the point where they can be overtopped and further suppressed by surrounding vegetation. When this growth situation is achieved, there would be no further control of competing vegetation.

Each area proposed for maintenance or release treatment undergoes a site specific analysis. During this analysis, alternative methods of vegetation control are considered including chemical, manual and mechanical means.

In recent years, herbicides have been used effectively to inhibit the growth of competing vegetation, thus increasing available water, nutrients and light for suppressed conifers. Herbicides are applied aerially or by several

ground methods. The method selected is dependent on costs, topography, limits of the equipment, kind and dispersion of target plants, potential environmental impacts and biological conditions. Most of the herbicides proposed for use in the SCCSYUs would be applied by helicopters equipped with positive shut-off spray systems to limit herbicides to the target areas. Helicopter application would be accomplished under contract through the competitive bidding process.

Timing of herbicide treatment is stringently controlled in relation to specified weather conditions such as temperature, humidity and wind. There is full authority for ordering cessation of operations based on adverse field conditions. Both equipment and operators are frequently checked by field project supervisors.

Design features included in herbicide project plans and contracts for application receive site specific environmental assessment. Assessments addressing specific herbicide projects are prepared and tiered under BLM's FEIS Vegetation Management with Herbicides: Western Oregon - 1978 through 1987.

Protective stream buffers (determined according to stream classification and herbicide used) and monitoring of herbicide application are as described in the FEIS mentioned above. Continuous administration of spraying contracts in progress is required. Water samples of adjacent streams are taken prior to spraying to establish baseline quality and at specified intervals thereafter.

The use of herbicides for release is included in all alternatives except for Alternative 4. Table 1-4 shows the chemicals, target species and estimated acreage of herbicide use as proposed during the 10-year period.

Alternative 4, which does not incorporate herbicide use, employs manual methods for release of 2,810 acres.

Precommercial Thinning

Precommercial thinning would be applied to timber stands at approximately 10 years of age. This treatment concentrates available nutrients, moisture and light into those trees which would be the eventual crop for future harvest.

The number of trees removed, per acre, during precommercial thinning is dependent on the density of the stand before thinning. Precommercial thinning will only be done on those areas that are expected to eventually be commercially thinned. While average spacing is approximately 12 feet, the number of crop trees left may vary between 245 and 320 per acre. Contract specifications, emphasized by field instructions to crews, cover desired spacing of crop trees and criteria for crop tree selection.

Fertilization

Acres proposed for fertilization include all precommercial thinning plus other acreage identified through reforestation and operations inventories as nutrient deficient (Operations Inventory Handbook).

Detailed on-site soil anaysis would be employed to determine composition of fertilizer needed, rate of application and timing between applications. The average application is expected to be 200 pounds of nitrogen per acre beginning when the stand is precommercially thinned and at 10-year intervals thereafter until 10 years before final harvest.

In addition to acceleration of growth for up to 7 years following treatment, fertilization tends to reduce shock associated with thinning.

COMPARISON OF IMPACTS

This section compares in tabular form (Table 1-5) the impacts of the proposed action and each alternative. While impacts have been described in detail in Chapter 3, Table 1-5 is presented to assist decisionmakers and reviewers by summarizing the impacts of each alternative, thereby permitting major issues to be defined and analyzed.

From the summary table, it can be seen that major issues include wildlife habitat modification, economic conditions, soil erosion, sedimentation and VRM considerations.

The two areas of major impacts are wildlife habitat and economic conditions. The greatest habitat modification would occur in Alternative 1, where almost 40 percent of old-growth habitat would be removed during the first decade. Were each alternative continued, however, Alternative 8 would result in all old growth being removed after 3 decades. Alternative 3 would have the least adverse impact on old-growth habitat over the long term.

Although the most detrimental to wildlife, Alternative 1 would be most beneficial to the economic situation, providing over 600 jobs above those presently available. Alternative 3 would have the greatest adverse impact on jobs, since about 1,300 jobs would be lost with this alternative.

Other major areas of impact are soil erosion and sediment yield. While all alternatives would have less impact than those experienced during the past decade, Alternative 8 would generate the greatest amount of soil erosion, primarily due to proportionally higher levels of road construction. Alternative 1, however, would contribute the greatest amount of sediment yield because of higher levels of clearcutting. Alternative 3 would have the least adverse impacts attributable to either soil erosion or sediment yield.

Visual resources, particularly certain highly scenic and/or highly sensitive areas considered in the constrained timber base of the proposed action and Alternatives 4, 5, 6 and 7, would be severely degraded under Alternatives 1 and 2. Alternative 3 would provide maximum protection.

Table 1-5 Summary of Impacts

Environmental Components Impacted	Units of Measure	Existing Situation	Proposed Action	1 Opt. Tbr.	2 Tbr. + Owls	3 Opt. Other	4 No. Herb.	5 F.P.O.	6 M.H.S.	7 No ACE	8 No Action	Remarks/Assumptions
Air Quality												
Particulates	tons/year	553	904	1,054	996	669	859	932	964	822	751	Based on research
Carbon monoxide	tons/year	1,955	3,196	3,726	3,520	2,369	3,037	3,293	3,409	2,908	2,656	data (US EPA 1978)
Soils												
Erosion	tons/decade	409,093	198,029	207,342	203,730	136,159	195,420	199,637	201,530	193,300	362,888	Estimate based on soil types & research data.
Water Resources												
Sediment yield	tons/decade	3,461	2,999	3,642	3,393	2,070	2,820	3,110	3,241	2,673	3,364	
Increased nitrogen	pounds/decade	NA	6,875	8,015	7,572	5,088	6,533	7,085	7,333	6,255	5,713	Slash burning
Water yield	acre feet/year	14,093	12,510	15,487	14,332	8,668	11,676	13,023	13,629	10,999	12,842	
Vegetation												
Acres denuded of vegetation												
Road construction	acres/decade	2,100	1,500	1,500	1,500	1,000	1,500	1,500	1,500	1,500	2,964	
Yarding	acres/decade	5,290	4,695	5,811	5,379	3,253	4,382	4,888	5,115	4,128	4,819	
Plant Habitat altered by												
Herbicide use	acres/decade	51,227	52,650	60,150	57,150	43,650	0	54,150	55,450	49,650	-	Acres not identified
Timber harvesting	acres/decade	62,486	37,120	46,163	42,661	24,965	34,872	38,506	40,137	33,945	70,774	for Alt. 8.
Wildlife Habitat												
Habitat modified	acres/decade	NA	75,706	88,658	83,373	50,581	73,458	77,092	78,723	71,631	84,499	Roads, harvest, thinning & hardwood conversion.
Early successional stage habitat, end 1st decade	acres	99,700	99,600	107,800	104,700	96,300	97,400	101,000	102,700	95,600	54,100	Habitat less than
Percent change	percent	NA	<1%	+8%	+5%	-3%	-2%	+1%	+3%	-4%	-46%	15 years old.
Early successional stage habitat, end 10th decade	acres	99,700	22,100	33,100	29,400	12,800	68,600	3,900	52,700	65,100	54,300	Habitat less than 15
Percent change	percent	NA	-78%	-67%	-71%	-87%	-31%	-96%	-47%	-35%	-46%	years old.
Old-growth habitat, end 1st decade	acres	64,200	42,800	38,500	40,200	49,700	44,000	42,100	41,100	45,000	48,300	Habitat 196 years and
Percent change	percent	NA	-33%	-40%	-37%	-23%	-31%	-34%	-36%	-30%	-25%	older.
Old-growth habitat, end 10th decade	acres	64,200	31,800	15,700	22,600	47,900	31,800	31,800	31,800	31,800	0	Habitat 196 years and
Percent change	percent	NA	-51%	-76%	-65%	-25%	-51%	-51%	-51%	-51%	-100%	older.
Cultural Resources	inadvertent degradation potential	NA	-M	-H	-H	-L	-M	-M	-M	-M	-M	Based on comparison of timber harvest levels
Visual Resources	contrast	NA	-L	-H	-H	-L	-L	-L	-L	-L	-M	
Ecologically Significant Areas	site degradation	NA	-L	-H	-M	-L	-L	-L	-L	-L	-L	
Energy Use												
Trillion Btu's consumed annually	trillion Btu's	NA	1.565	1.881	1.757	1.089	1.270	1.623	1.686	1.399	1.759	
Socioeconomics 1/												
Total Earnings	$ Thousands 2/	49,576	46,782	58,138	53,675	32,254	43,640	48,817	51,208	40,885	49,576	
Total Employment	1985 ave. jobs	3,613	3,408	4,235	3,911	2,350	3,180	3,557	3,731	2,961	3,613	
Timber Industry Employment	1985 ave. jobs	1,437	1,356	1,685	1,556	935	1,265	1,415	1,485	1,178	1,437	
O & C Distributions	Percent change	-	-1.2	+2.9	+1.3	-6.5	-2.4	-0.5	+0.4	-3.5	-	Effect same on all counties & BLM

+ Beneficial - Negative L Low M Medium H High

1/ Socioeconomic data except where otherwise indicated represent four county area: Coos, Curry, Douglas and Lane Counties.
2/ 1985 estimate in thousands of 1978 dollars.

IMPLEMENTATION

Final Decisions

Final decisions with regard to land use allocation, 10-year timber management activities and the allowable cut for SCCSYUs cannot be made until 30 days after the final environmental impact statement has been filed with the Environmental Protection Agency (EPA). A record of decision in accordance with the Council on Environmental Quality regulations (40 CFR 1505.2) will then be issued. Significant conflicts, alternatives, environmental preferences, economic and technical considerations and the Bureau's statutory mission will be addressed in the decision document.

Requirements for Further Environmental Assessment

This environmental impact statement may best be described as a regional programmatic statement for the proposed 10-year timber management plan and is considered applicable for the decade. A series of environmental assessments (EAs) will be prepared on detailed site specific plans for each type of treatment under consideration for each year. Interdisciplinary impact assessment will be tiered within the framework of this and other applicable environmental impact statements.

An environmental assessment of a timber sale (or group of sales) will address the effects of the harvest method, yarding system, road construction or reconstruction, slash disposal and any other treatments conducted under the terms of a timber sale contract. EAs will also be prepared in forest development projects such as precommercial thinning, planting, animal control, fertilization and herbicide applications. It is expected that environmental assessments will either identify modest impacts or lead to mitigation resulting in modest net impacts. With problems and conflicts identified through analysis, it is possible to design the proposed project in an environmentally sensible manner. Where the action is to be accomplished by a contractor, the environmental assessment is a primary means for determining appropriate contract stipulations. Projects to be accomplished by BLM personnel are conducted in accordance with the findings of the assessment and decision documents.

If an environmental assessment indicates potential for significant impacts not already described in an existing EIS, an environmental impact statement or a supplement to an existing EIS may be required.

INTERRELATIONSHIPS

Federal Agencies

The South Coast and Curry SYUs share in part a common boundary with the Siuslaw and Siskiyou National Forests. Coordination between the BLM District Manager and the Forest Supervisors is routine. Specific project and program coordination takes place as needed between all management levels of each

agency and also between resource specialists. A cooperative agreement provides for interagency road construction and use.

The U.S. Army Corps of Engineers has the authority, under Section 404 of the Clean Water Act of 1977 (P.L. 95-217), to regulate the discharge of dredged or fill materials into any estuary, wetland or streams of the United States with flow in excess of 5 cubic feet per second. Normal silvicultural practices are exempt from this regulation. Based on the adequacy of BLM environmental protection practices, the Corps has issued BLM a general permit for all such activities. Under the permit, BLM provides the Corps, the State Division of Lands and certain environmental review agencies with advance notice of specific proposed projects.

The U.S. Fish and Wildlife Service administers the Endangered Species Act of 1973 (as amended). Accordingly, BLM consults with that agency when it is determined that a threatened or endangered species or its critical habitat may be affected.

State Government

Section 202(c) of the Federal Land Policy and Management Act requires BLM to coordinate its planning efforts with those of State and local governments; assist in resolving inconsistencies in our mutual planning efforts; provide for State and local governmental involvement in development of BLM land use programs, regulations and land use decisions; and develop BLM resource management plans and programs consistent with those of State and local government to the extent that such BLM plans and programs are also consistent with Federal law and regulations. BLM coordination efforts involve a number of State and local administrative and planning agencies as described below.

The Intergovernmental Relations Division for the State of Oregon is the Clearinghouse for the various State agencies. Notice of all BLM planning and major proposed actions are provided for coordinated State level review by the State Clearinghouse. The Regional Councils of Government serve as the clearinghouse for coordinated review of proposed BLM activities by county and local governments in their respective areas of interest.

The Oregon State Forester, by means of the Forest Practices Act of 1972, regulates timber harvest methods and supportive practices on all non-Federal lands within the SYUs. Minimum standards are prescribed relating to the following forest practices:

- Reforestation of economically suitable lands.
- Road construction and maintenance on forest land.
- Chemical applications.
- Slash disposal.

Although Federal agencies are not bound by State forest practice rules, Bureau minimum standards meet or exceed State rules. The BLM and USFS, acting jointly, have entered into a Memorandum of Understanding with the State Forester in this regard.

BLM is a cooperator in the Statewide Smoke Management Plan administered by the Oregon State Forester. The primary objective of the plan is to keep smoke from slash disposal operations away from population centers. Slash burning is allowed to begin only when smoke dispersion conditions are determined by Oregon State Department of Forestry (OSDF) to be favorable.

OSDF is the primary contractor for fire protection of public lands administered by BLM in the SCCSYUs. That department undertakes pre-suppression and suppression actions for all lands in the area.

The Oregon Department of Environmental Quality (ODEQ) has lead responsibility for statewide water quality management planning in accordance with Section 208 of P.L. 92-500 (Federal Water Pollution Control Act) as amended by P.L. 95-217 (Clean Water Act). BLM and ODEQ have entered into a Memorandum of Understanding which outlines their respective roles in meeting State water quality objectives. The Memorandum assures close interagency cooperation, development and implementation of appropriate practices and control measures to comply with the Clean Water Act, and compliance with State requirements. BLM forest management practices meet or exceed objectives of the statewide water quality management plan.

Management of wildlife, including fish, within the SCCSYUs is the responsibility of the Oregon Department of Fish and Wildlife. BLM, in managing lands under its jurisdiction, considers wildlife habitat as a resource category. Cooperative agreements describe the responsibilities of the two agencies.

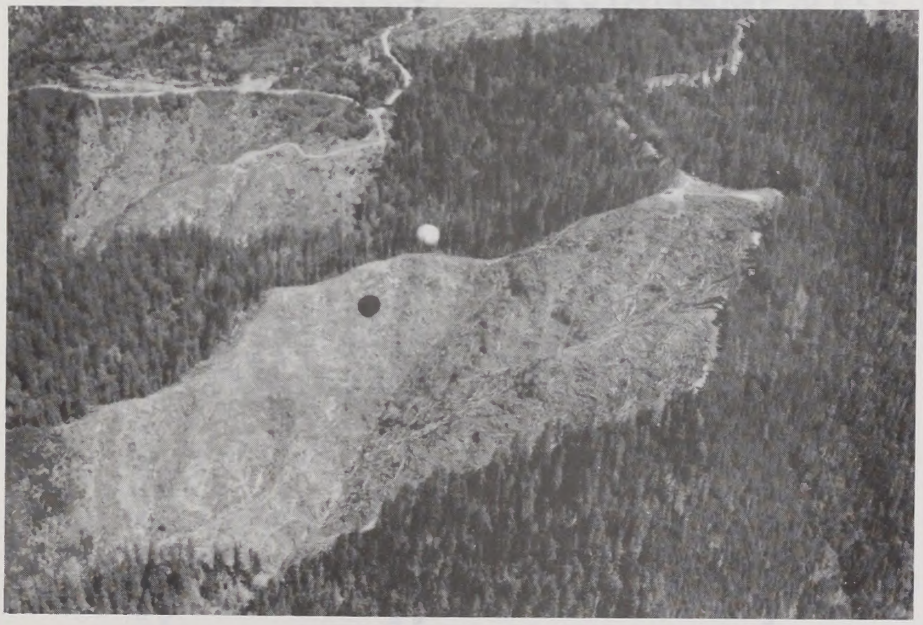
The Oregon Land Conservation and Development Commission (LCDC) administers the state comprehensive land use planning program as provided in Oregon State Statutes, Chapter 197 (ORS 197). In this program, county and local governments are required to develop comprehensive land use plans and implementing ordinances consistent with 14 statewide planning goals and guidelines. These call for a balance between conservation and development to best meet public needs.

LCDC is the primary State agency responsible for implementing the Oregon Coastal Management Program established under P.L. 94-370, the Coastal Zone Management Act (CZMA). This program relies initially on county and local comprehensive planning under ORS 197 with special emphasis on unique characteristics of coastal resources. In addition to the 14 statewide goals for planning consideration, coastal planning is guided by four special State Coastal Goals and Guides: Estuarine Resources, Coastal Shorelands, Beaches, and Dunes and Ocean Resources.

CZMA requires Federal activities to be consistent to the maximum extent practicable with the Oregon Coastal program. Although Federal lands are specifically excluded from the coastal zone, such BLM activities as would directly affect coastal resources outside the BLM lands, require BLM consistency statements. These statements are made through the A-95 Clearinghouse notification and review process.

Close relations have been established with LCDC to ensure cooperation and coordination of BLM programs and planning efforts with those conducted by county and local governments under ORS 197 and CZMA. The relationship of the South Coast and Curry proposed action and alternatives to the LCDC Statewide and Coastal Goals is shown on Table 1-6. Discussion comments on this table generally focus attention on deficiencies in addressing the listed goals.

Most of southwest Oregon is timber producing land. In addition to the BLM, jurisdictions include the U.S. Forest Service, State of Oregon, the counties, and private companies and individuals. Each entity approaches management of timber lands differently although some, periodically, prepare internal or public plans for their management.



Balloon logging near Tioga Creek

Table 1-6 Relationship of South Coast and Curry Proposed Action and Alternatives to LCDC Statewide and Coastal Goals [1/]

LCDC Statewide Goal Number and Description	Discussion
1. To insure citizen involvement in all phases of the planning process.	Public participation is an integral part of the BLM planning process used in development of the proposed action and alternatives.
2. To establish a land use process and policy framework as a basis for all decisions and actions.	The proposed action and all alternatives have been developed in accord with the land use planning process authorized by the Federal Land Policy and Management Act of 1976 which provides a policy framework for all decisions and actions.
4. To conserve forest lands for forest uses.	The planning area is predominantly forest land. The proposed action and alternatives all provide retention of inventoried forest lands for forest uses. While Alternatives 1 and 2 place emphasis on increased timber production, Alternative 3 stresses non-timber values. No alternative exceeds the productive capacity of the land base and all proposed uses are compatable with forest uses in this goal.
5. To conserve open space and protect natural and scenic resources.	All alternatives including the proposed action address this goal. However, Alternative 1 provides only modest provision for visual and scenic resources, fish and wildlife, and watershed protection in designated riparian zone buffers and fragile sites; Alternative 2 is similar but includes additional wildlife habitat protection in timber production area.
6. To maintain and improve the quality of the air, water and land resources.	Only Alternative 8 does not fully address necessary enhancement of land and water quality for multiple use of forest lands or for meeting Federal and State minimum water quality standards. All alternatives would comply with the statewide smoke management plan.
7. To protect life and property from natural disasters and hazards.	All alternatives include identification of potential hazard areas and general BLM program and operational measures for protection of life and property from natural disasters and hazards.
8. To satisfy the recreational needs of the citizens of the State and visitors.	All alternatives address this goal. However, although Alternatives 1, 2 and 8 retain existing recreation areas, they provide little or no future expansion. They also provide least attention to enhancement of visual and scenic attractions or maintenance of wildlife habitat to meet increased recreational demands.
9. To diversify and improve the economy of the State.	Alternatives 1 and 2 would increase timber production for improved economic returns but lack diversity in that little or no attention is given to non-timber values. Although overall economic returns are improved, diversity is not achieved. Alternative 3, which emphasizes non timber values, provides diversity but results in substantial decreases in total economic returns. Alternative 7 does not include anticipated increased timber production that should result from intensified management practices. Management practices in Alternative 8 do not encourage diversity of use because more land is managed for timber production but at a lower level of intensity.
LCDC Coastal Goal Number and Description	
19. To conserve the long-term values, benefits and natural resources of the near shore ocean and continental shelf.	BLM programs for protection and enhancement of anadromous fisheries would relate to this goal. As discussed above for Goal 5, Alternatives 1, 2 and 8 make the least provision for protection and enhancement of upstream fisheries habitat.

1/ LCDC goals not generally applicable to the proposal and alternatives are: 3. Agricultural Lands; 10. Housing; 11. Public Facilities and Services; 12. Transportation; 13. Energy Conservation; 14. Urbanization; 15. Willamette Greenway; 16. Estuarine Resources; 17. Coastal Shorelands; and 18. Beaches and Dunes.

CHAPTER 2

AFFECTED ENVIRONMENT

CHAPTER 2 AFFECTED ENVIRONMENT

This chapter addresses the environment as it exists today within the South Coast and Curry Sustained Yield Units (SCCSYUs, SYUs). Since intensive timber management has been practiced within the SYUs for several decades, the environment described is seldom natural or pristine but exhibits the effects of human use.

Chapter 2 provides a basis on which impacts of the proposed action and alternatives may be assessed. Data and analysis will be commensurate with the importance of the impact, with less important material summarized, consolidated or simply referenced.

In preparation of this chapter, the primary data sources are documents of the Bureau planning system developed by the Coos Bay District. The Unit Resource Analysis, Planning Area Analysis and proposed Management Framework Plan for the South Coast and Curry area are available for review at the Coos Bay District Office, 333 South Fourth Street, Coos Bay, Oregon 97420.

Other references supplementary to or updating planning system data are cited within the body of the text by author and date of publication. A listing of these references appears in the References Cited.

CLIMATE

The climate of the South Coast and Curry EIS area is moist and temperate due to prevailing westerly winds and the proximity of the Pacific Ocean. Winters are generally cool and wet, and summers are warm and dry with intermittent rains (Appendix C). Rainfall along the coast averages about 60 inches a year but increases at higher elevations and inland to as much as 100 inches annually.

Summer winds are generally steady, north-northwesterly winds, averaging 17 miles per hour. Winter winds are generally steady offshore breezes from south-southeast, averaging 15 miles per hour with occasional gales from the southwest. Autumn and spring are transitional periods when maximum speeds far exceed averages (Oregon Department of Geology and Mineral Industries 1975).

The occasional strong easterly winds which blow for short periods of time in the summer reduce humidity to 10 or 20 percent, creating extreme fire hazards. Strong southwesterly winds (up to 75-100 miles per hour) accompanying intense winter storms may cause timber, particularly old growth, to blow down. This blowdown can impact watersheds by exposing soil to erosion and by blocking drainageways, thus contributing to debris torrents. Rainfall during these storms may be as high as 4 to 6 inches in 24 hours, and may cause landslides.

AIR QUALITY

Under the Clean Air Act Amendments of 1970, Oregon has been divided into five Federal Air Quality Control Regions (AQCRs) on the basis of pollution concentrations, geography and economics. The EIS area is in the southwest Oregon AQCR. Air quality in this area is good and meets all air quality standards (ODEQ 1977).

The only sampling site within the EIS area is located in Coos Bay. Since 1970, total suspended particulate levels have exceeded secondary Federal health standards (more than 150 milligrams per liter (mg/1)) only four times and have never violated primary standards (more than 260 mg/1) (ODEQ 1978). The annual geometric mean for total suspended particulates has gradually declined from 51.7 microgram per cubic meter (ug/m^3) in 1970 to 40.3 ug/m^3 in 1978 (ODEQ 1978a). This indicates gradual improvement of surrounding air quality. Sampling of other air pollutants is not conducted at present.

The wood processing industries, forest fires and slash burning account for 51 percent of the total particulates produced in Douglas, Coos and Curry counties. Slash burning accounted for 22 percent of the total particulates (ODEQ 1976).

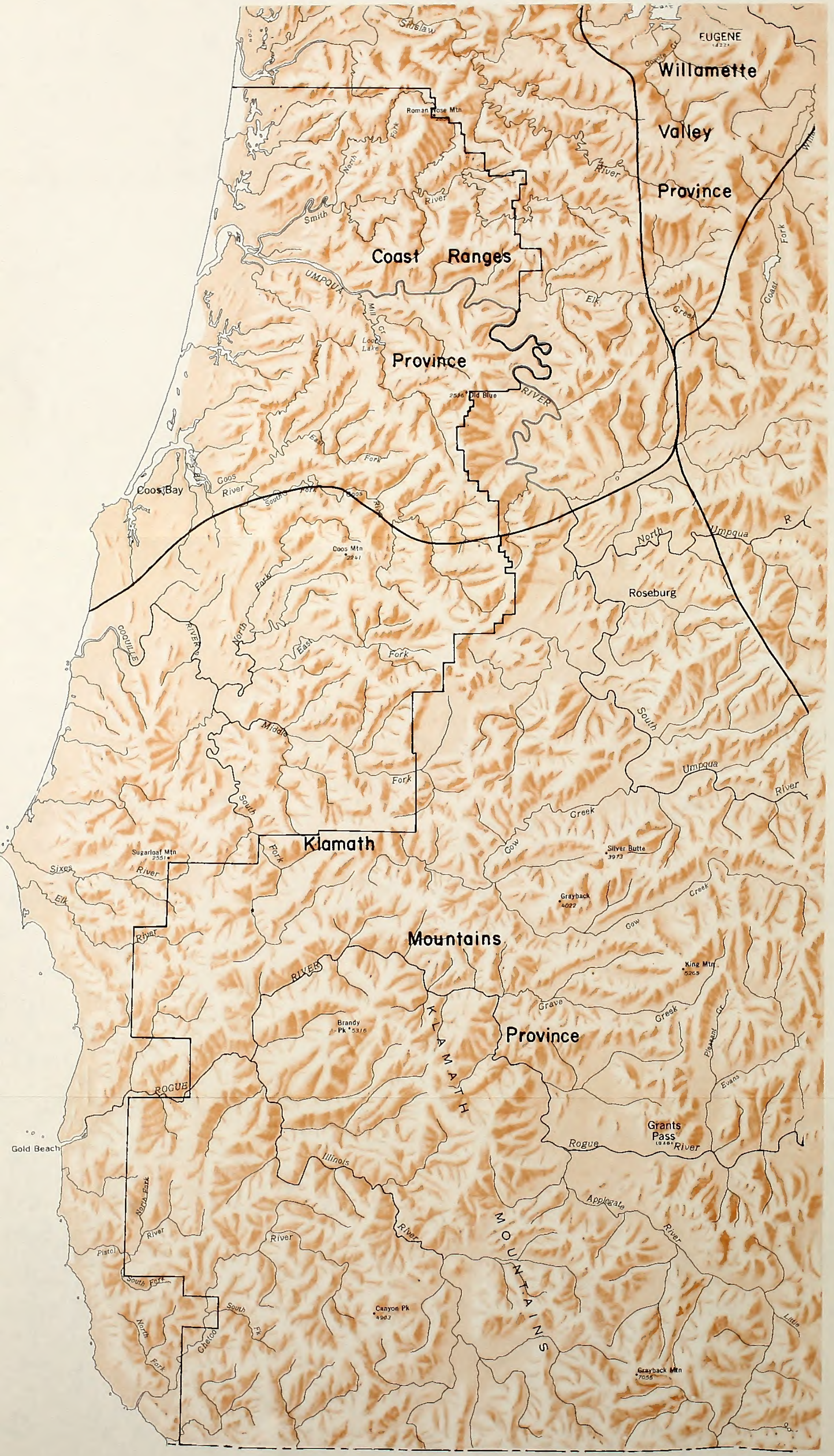
GEOLOGY AND TOPOGRAPHY

The topography of the EIS area is a rugged and highly dissected terrain with steep, narrow canyons (Figure 2-1). Elevations range from sea level to 2,858 feet at Roman Nose Mountain in the north and 3,432 feet at Bosley Butte in the south. Slopes of 70 to 100 percent are common. Steep slopes and debris avalanches seem closely related (Ketcheson and Froehlich 1977).

The EIS area contains portions of two physiographic provinces (Figure 2-1). The Coast Ranges Province is comprised mostly of sedimentary rocks, such as sandstone and siltstone. Scattered volcanic materials also occur near the southern boundary. The Klamath Mountains Province is very complex due to age and repeated faulting and folding and periodic intrusions of igneous rocks. The most common rock types are sandstone, siltstone, schist and serpentine. Breccias, granites, lava and chert occur locally in smaller amounts (Townsend 1977).

Soils

The "Soils Inventory of the Coos Bay District" (Townsend et al. 1977) describes the soils of the EIS area in detail. This inventory report and its accompanying maps may be examined at the Coos Bay District Office or the Oregon State Office of the BLM. A generalized soils map (Figure 2-2) was made by combining soil series and/or soils associations that either have similar properties or frequently occur together. A summary of the properties, interpretations and acreages described in the inventory appears in Appendix D1.



U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

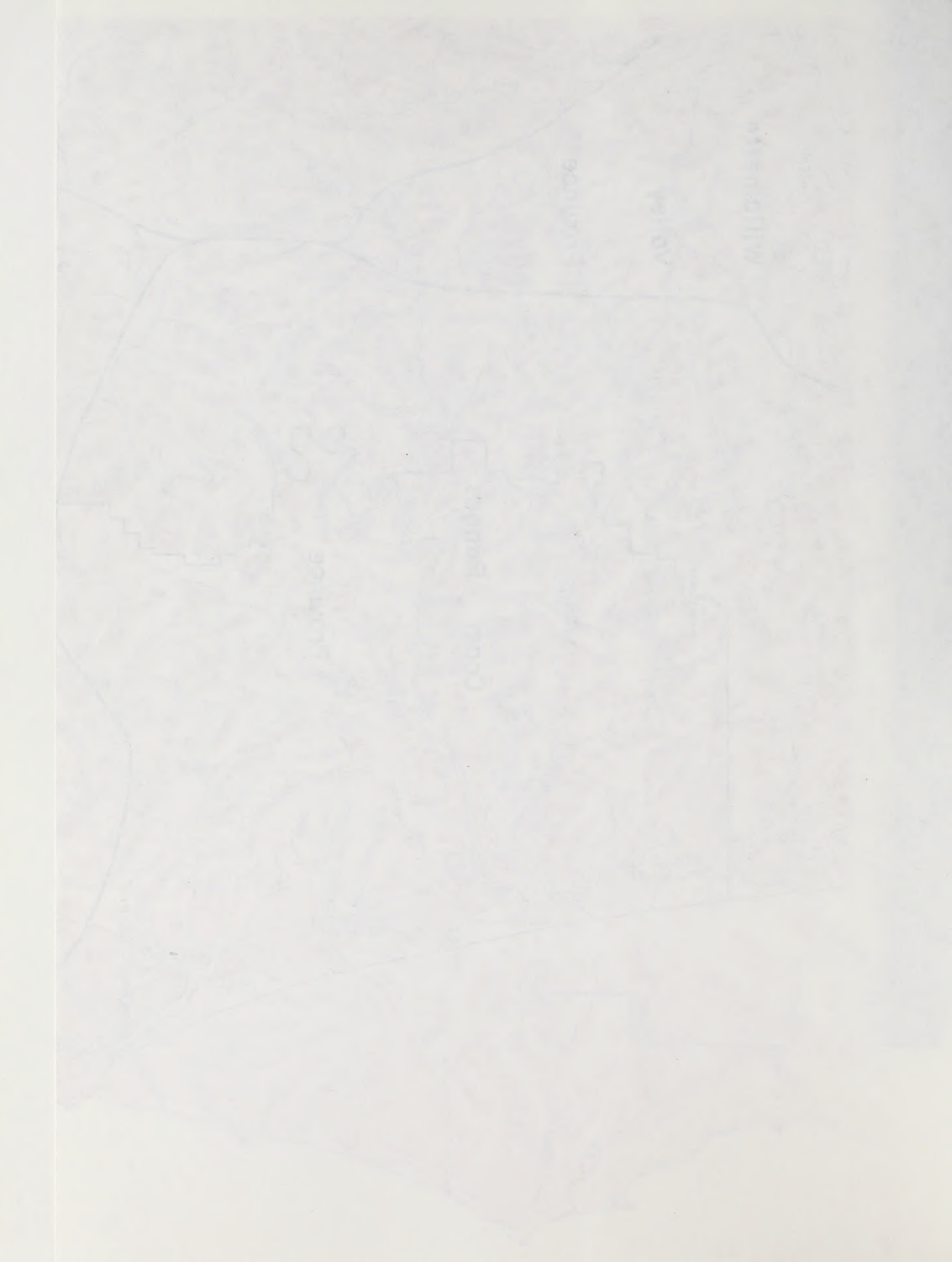
SOUTH COAST & CURRY SUSTAINED YIELD UNITS

COOS BAY DISTRICT
1980

Scale 1:500,000
10 0 10 MILES
10 0 10 KILOMETERS

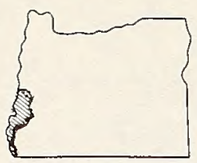
FIGURE 2-1

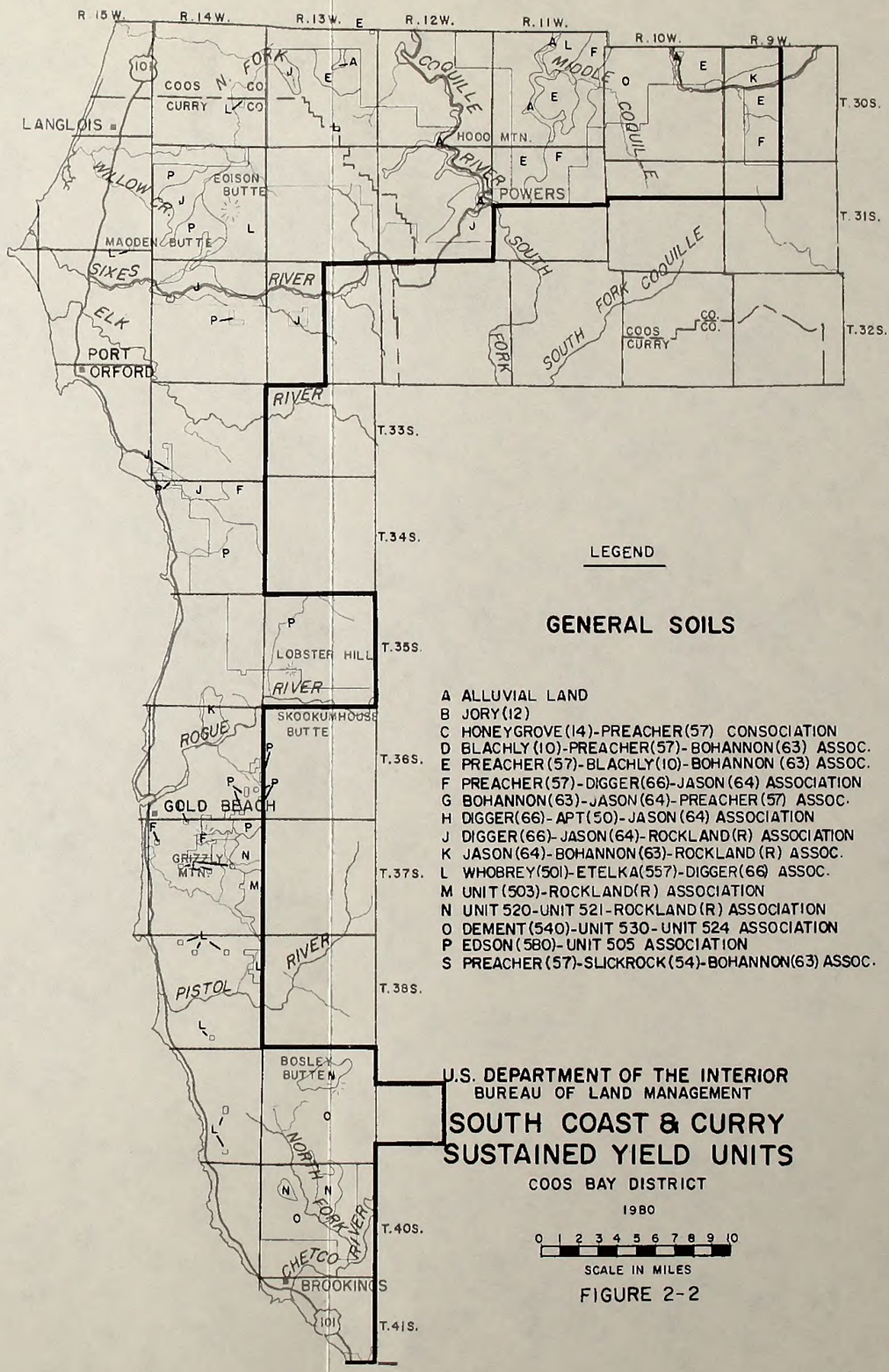
RELIEF MAP and PHYSIOGRAPHIC PROVINCES



NORTH HALF

SOUTH HALF





LEGEND

GENERAL SOILS

A ALLUVIAL LAND
B JORY(12)
C HONEYGROVE(14)-PREACHER(57) CONSOCIATION
D BLACHLY(10)-PREACHER(57)-BOHANNON(63) ASSOC.
E PREACHER(57)-BLACHLY(10)-BOHANNON(63) ASSOC.
F PREACHER(57)-DIGGER(66)-JASON(64) ASSOCIATION
G BOHANNON(63)-JASON(64)-PREACHER(57) ASSOC.
H DIGGER(66)-APT(50)-JASON(64) ASSOCIATION
J DIGGER(66)-JASON(64)-ROCKLAND(R) ASSOCIATION
K JASON(64)-BOHANNON(63)-ROCKLAND(R) ASSOC.
L WHOBREY(501)-ETELKA(557)-DIGGER(66) ASSOC.
M UNIT(503)-ROCKLAND(R) ASSOCIATION
N UNIT 520-UNIT 521-ROCKLAND(R) ASSOCIATION
O DEMENT(540)-UNIT 530-UNIT 524 ASSOCIATION
P EDSON(580)-UNIT 505 ASSOCIATION
S PREACHER(57)-SLICKROCK(54)-BOHANNON(63) ASSOC.

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SOUTH COAST & CURRY SUSTAINED YIELD UNITS

COOS BAY DISTRICT

1980

0 1 2 3 4 5 6 7 8 9 10

SCALE IN MILES

FIGURE 2-2

Within the EIS area there are four groups of soils which require careful management: extremely fragile soils, fragile soils, special problem soils and highly compactible soils (Table 2-1).

Extremely fragile soils are mostly shallow (less than 20 inches to bedrock), have greater than 35 percent by volume of coarse fragments (rock and gravel), occur on slopes of 60 to 80 percent or greater and have low water holding capacity and moderately rapid permeability. Debris avalanches, debris flows and debris torrents are the most common types of failure in these soils. Headwalls and roads are the most likely point of origin for these failures. Soils mapped as extremely fragile are shown in Table 2-1, and cover 18,385 acres (5.6 percent of the EIS area).

Fragile soils are similar to extremely fragile soils but have less steep slopes (35 to 80 percent) and are moderately deep, having 20 to 40 inch profiles. There are 45,700 acres (14.0 percent) of fragile soils mapped in the EIS area.

The Whobrey (501) series has been designated a special problem soil because of a dense gray clay subsoil. The clay restricts percolation (resulting in a perched water table), is very plastic when wet and consequently is not stable even on gentle slopes. Whobrey soils are mapped in association with Etelka (557) and Digger (66) soils. There are 6,439 acres (2 percent of the EIS area) mapped as special problem soils. Whobrey soils are highly productive except in areas where water stands at or near the surface.

The highly compactible soils such as Apt (50), Blachly (10), Dement (540), Edson (580), Honeygrove (14) and Whobrey (501) series are usually found on gentle to moderate slopes and are very productive and amenable to intensive management. These soils occur as the primary component in mapping units on 57,364 acres (17.6 percent) of the EIS area. Whobrey (501) has been identified as both a special problem soil and a highly compactible soil (Table 2-1).

WATER RESOURCES

BLM-administered land in the EIS area contains a large portion of the Smith River watershed and small portions of the Umpqua, Coos, Coquille, Chetco, Rogue and Sixes River watersheds.

The major use of water in the area is for industry. Secondary uses include irrigation, recreation (on inland waters and coastal lakes), anadromous fisheries and domestic water supply (Oregon Water Resources Department 1978).

Rock of low permeability and porosity underlies most of the EIS area, so only a small portion of the total rainfall can be stored as groundwater. Streamflow, therefore, reflects seasonal variations in rainfall, with maximum flow

Table 2-1 Soils Requiring Careful Management

Extremely	Fragile	Soils	Acres
64-R Y	Jason-Rockland	60-80%	6,790
64-R-63 Z	Jason-Rockland-Bohannon	80%	1,400
R-64 Y	Rockland-Jason	60-80%	1,055
66-64-R YZ	Digger-Jason-Rockland	60-80%	930
564-R YZ	Umpcoos-Rockland	60-100%	8,210
			18,385
Fragile Soils			
64-63 XY	Jason-Bohannon	35-80%	10,690
64-63-R Y	Jason-Bohannon-Rockland	60-80%	6,360
64-66 Y	Jason-Digger	60-80%	880
64-66-57 XY	Jason-Digger-Preacher	35-80%	1,280
64-66-R Y	Jason-Digger-Rockland	35-80%	2,570
64-R-63 Y	Jason-Rockland-Bohannon	60-80%	675
66-64-R Y	Digger-Jason-Rockland	60-80%	14,145
66-50-57 XY	Digger-Apt-Preacher	35-80%	1,600
66-64-50 XY	Digger-Jason-Apt	35-80%	930
66-50-64 XY	Digger-Apt-Jason	55-80%	2,650
50-63 XY	Apt-Bohannon	35-80%	350
64-R-66 XY	Jason-Rockland-Digger	35-80%	2,290
505-R X	505-Rockland	35-60%	1,100
R-505 X	Rockland - 505	35-60%	180
			45,700
Special	**Problem**	**Soils**	
501-557 WX	Whobrey-Etelka	10-60%	4,949
66-557-501 XY	Digger-Etelka-Whobrey	35-80%	390
557-66-501 XY	Etelka-Digger-Whobrey	35-80%	190
557-501-66 X	Etelka-Whobrey-Digger	35-60%	430
557-501 WX	Etelka-Whobrey	10-60%	480
			6,439
Highly	**Compactible**	**Soils**	
10 WX	Blachly	10-60%	7,450
10-57 WV	Blachly-Preacher	0-35%	13,670
10-57-63 WX	Blachly-Preacher-Bohannon	10-60%	6,080
10-57-66 WX	Blachly-Preacher-Digger	10-60%	690
10-66 X	Blachly-Digger	35-60%	100
12 WX	Jory	10-60%	740
14 XW	Honeygrove	10-60%	8,180
14-50 XW	Honeygrove-Apt	10-60%	2,940
14-57 WX	Honeygrove-Preacher	10-60%	20
14-57-66 XW	Honeygrove-Preacher-Digger	10-60%	1,700
50-14 XW	Apt-Honeygrove	10-60%	1,150
50-57-14 XW	Apt-Preacher-Honeygrove	10-60%	310
50-63 XY	Apt-Bohannon	35-80%	900
50-66-14 XW	Apt-Digger-Honeygrove	10-60%	480
501-557 WX	Whobrey-Etelka	10-60%	5,430
540-425-530 XW	Dement-Unit 424-Unit 530	10-60%	524
540-530-R XW	Dement-Unit 530-Rockland	10-60%	3,230
580 XW	Edson	10-60%	2,190
580-505 X	Edson-Unit 505	35-60%	160
580-505-R X	Edson-Unit 505-Rockland	35-60%	560
			57,364
	TOTAL	39.2% of SYUs	127,888

in January and minimum flow in August and September. Mean annual runoff for the area is between 29 and 34 inches per acre (USDI, GS 1978). Water yield data for individual drainages is given in Appendix E.

Water quality within the South Coast and Curry region is generally good. Mean annual sediment yield in the Coquille, Coos and Umpqua Rivers was reported at 1,233,232 cubic yards from 5,096 square miles of watershed drained (Townsend et al. 1977). Sediment yield computed for each basin is 0.223 tons/acre/year and represents the combined yields from all sources and ownerships.

Present non-point source pollution problems in the SCCSYUs include those of elevated water temperatures, nuisance algae, excessive debris, sedimentation, streambank erosion and water withdrawals causing stream quality problems (ODEQ 1978b). The extent of these problems in major rivers of the SYUs is shown in Table 2-2.

Table 2-2 Non-Point Source Pollution Problems

River	Streambank Erosion	Sedimentation	Debris	Withdrawal	Elevated Temperature	Algae
Coos		Moderate	Severe		Severe	
Coquille	Moderate	Moderate	Severe	Severe	Severe	
Smith		Moderate	Moderate		Severe	
Umpqua		Moderate	Moderate	Moderate	Severe	Moderate
Chetco	Moderate	Moderate	Moderate		Moderate	Moderate
Rogue	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Sixes	Moderate	Moderate	Moderate		Moderate	

Note: Severe: a problem where there is substantial or nearly complete intereference with recreational opportunities or other desired uses of the water--where physical or chemical character of the stream, lake or reservoir has been severly changed, resulting in a substantial alteration of fish or invertebrate populations.

Moderate: a problem which interferes with the desired uses of the water body or interferes with the normal life history or composition of aquatic populations.

Source: ODEQ 1978b

VEGETATION

The SCCSYUs are located in the Northwest Coastal Coniferous Sub-biome, which is the most densely forested region in the Coniferous Biome. Characterized by easy regeneration and rapid growth, it produces trees of impressive size (USDI, BLM 1975).

For purposes of this EIS, vegetation is generally described in terms of "zones" adapted from those identified by Franklin and Dyrness in Natural Vegetation of Oregon and Washington (1973). A further detailed description of each zone and plant community listed below may be found in that source or from data prepared in the Coos Bay District. A complete list of common and scientific names for all plants discussed is available upon request.

Two major vegetation zones within the SYUs are the Sitka Spruce Zone and the Western Hemlock Zone. These zone names denote only the single dominant species of the potential climax vegetation.

Sitka Spruce Zone

The Sitka Spruce Zone is usually found within a few miles of the coast except in some major valleys and drainage areas. A small percentage of the land in the SYUs is in this zone.

Various associations of trees, shrubs and forbs may be found in three major plant communities from the coast inland. These are: 1) the ocean-front and sand dune community; 2) the Sitka spruce, western hemlock, salal, deerfern community; 3) the western hemlock, Sitka spruce, devilsclub, ladyfern community.

Western Hemlock Zone

The Western Hemlock Zone, found throughout the district, extends from the eastern edge of the Sitka Spruce Zone to the SCCSYUs eastern boundary at all elevations. It is famous for its subclimax species, Douglas-fir, which is often the sole dominant tree in the forest. As a pioneer species, Douglas-fir normally constitutes a seral (successional) stage during the vegetative community development process. This zone encompasses seven major plant communities with various associations of trees, shrubs and forbs relative to specific climatic variations such as aspect, moisture, soil type and depth, etc. These communities are listed on a site moisture gradient from dry to wet:

a. Knobcone pine
b. Tanoak, manzanita
c. Douglas-fir, oceanspray, salal
d. Western hemlock, Douglas-fir, rhododendron, Oregongrape
e. Western hemlock, vine maple, Oregongrape
f. Western hemlock, swordfern, Oregon oxalis
g. Western red cedar, western maidenhair fern, ladyfern

In addition to the major species identified above, there are inclusions of Port-Orford-cedar, California laurel (Oregon myrtle), Jeffrey pine, sugar pine and redwood in the southern portion of the Curry SYU.

Commercial Timber

Of the commercial timber found throughout the SYUs, 91 percent is softwood while the remaining 9 percent is hardwood (Bassett 1977). The volumes of growing stock and sawtimber by major ownership are shown in Table 2-3. The sawtimber volume is comprised of 71 percent Douglas-fir, 24 percent other softwoods and the remaining 5 percent hardwoods.

Table 2-3 Volume of Growing Stock and Sawtimber on Commercial Forest Land, Coos, Curry and Douglas Counties, January 1, 1975

County	Total 1/	National Forest	BLM	Other public	Forest industry	Other private
			Million cubic feet			
Growing stock 2/						
Coos	3,268	327	1,012	441	998	490
Curry	2,521	1,782	252	11	213	261
Douglas 3/	11,291	5,537	2,859	189	2,290	416
Total	17,080	7,646	4,123	641	3,501	1,167
			Million board feet			
Sawtimber 4/						
Coos	19,497	4,361	6,482	2,170	4,517	1,966
Curry	12,428	9,333	1,371	71	729	824
Douglas 3/	60,069	28,649	17,204	948	12,108	1,161
Total	91,994	42,343	25,057	3,189	17,354	4,051

1/ Totals may differ slightly from sum of figures shown due to rounding.
2/ Includes trees 5-inch diameter breast height (dbh) and larger.
3/ Reflects approximately 4 percent of BLM's growing stock and sawtimber volume in Douglas County is contained in the SCCSYUs.
4/ Includes trees 11-inch dbh and larger. Converted to 16-foot Scribner log scale.

Source: Bassett 1977.

The land administered by BLM in these three counties (19 percent) contains 24 percent of the growing stock and 27 percent of the sawtimber volume.

Threatened and Endangered Plants

Endangered plants are those species that are in danger of extinction throughout all or a significant portion of their range. Threatened plant species are those that presently are not endangered but are likely to become so within the forseeable future throughout all or a significant portion of their range.

Botanical surveys for threatened and endangered plants were conducted on the Coos Bay District in 1978 and 1979 and are continuing. At present, there are no Federally-listed threatened or endangered plants in the EIS area. However, one officially listed "endangered" species in California, McDonald's Rock Cress (Arabis McDonaldiana), although not yet observed on BLM administered lands, has been observed in the southern portions of Curry County. The U.S. Fish and Wildlife Service will amend the listing to include Oregon. In addition, four other species which are candidates for listing by the U.S. Fish and Wildlife Service have been observed in the EIS area. These plants are California lady slipper (Cypriedium californicum), California pitcher plant (Darlingtonia californica), western lilly (Lilium occidentale) and Gentiana bisetaea. Cypriedium and Darlingtonia plants have been observed on BLM lands.

ANIMALS

Terrestrial Animals

Animal distribution, diversity and abundance are dependent on various factors; of primary importance is vegetation. Each vegetational zone described in the previous section contains a variety of plant communities which may be in different successional stages. Each successional stage has a unique structure and it is primarily this structure to which animal communities respond. The differences in communities, successional stages and structure provide habitat diversity and account for the variety of animals found in the planning area.

Successional stages are dynamic. They are always progressing toward their climax form and during this progression their animal components are also changing. A climax western hemlock forest supports a very different animal association than it did in its early successional stage several hundred years before. Progress toward climax can be curtailed at any point by outside influences, either natural or artificial. For instance, fire or logging may set back succession, and those animal species associated with the current stage will be replaced with those adapted to exist in the early successional stages.

Modifying or removing one particular stage, e.g. old growth, has a profound effect on those individuals and species occurring there. It is recognized that these effects do not stop with just those species, as the ecosystem as a whole is altered by the modification of one of its parts. Certain results may be harmful to some species and beneficial to others, but all are affected.

Habitat structure for all lands within the SCCSYUs regardless of ownership or administration cannot be accurately calculated. However, based on data from a variety of sources, habitat structure for the entire South Coast area was estimated for all forest lands, including wilderness areas, of Coos and Curry counties and that portion of Douglas County within BLM's SCCSYUs. The entire South Coast area in this sense aggregates approximately 1.99 million acres compared to 306,000 acres in the SCCSYUs at the proposed action level. The percent of these lands estimated in each habitat age type for the entire area and for BLM is shown below.

Table 2-4 Habitat Structure for the Entire South Coast Area

Habitat Age	Percent Entire area	Percent BLM
Grass/Forb (Non-Stocked and 0-7 years)	24	19
Brush/Seedling (8-15 years)	27	13
Pole/Sapling (16-45 years)	14	16
Young 2nd Growth (46-115 years)	18	19
Mature (116-195 years)	3	12
Old Growth (196 + years)	14	21

Source: USDI, BLM; USFS; ODFW; Beuter Report; Industrial Forestry Association.

There are 32 species of amphibians and reptiles, 207 species of birds and 55 species of mammals that occur or probably occur in the planning area. A complete list is available on request from the Oregon State Office.

A representative list of terrestrial vertebrates that seemed most likely to be affected either positively or negatively by the proposed treatments was developed (See Table 2-5). The list was limited to those species normally associated with the forest types that would be harvested. The list was prepared from many published sources (Browning 1975; Burt and Grossenheider 1964; Gabrielson and Jewett 1940; Ingles 1965; Maser et al. (in press); Meslow 1977; Peterson 1961; Robbins et al. 1966) as well as from BLM documents.

To further reduce the number of species to those which were judged significant, six criteria were established. Those meeting one or more of these criteria appear in Table 2-5. These criteria of significance are:

Threatened, or endangered.
Depend on or find their optimum habitat in mature or old-growth timber for part of their life cycle.
Depend on or find their optimum habitat in early seral stages for part of their life cycle.
Recreation or commercial importance.
Limited adaptability.
Important prey species of the spotted owl.

Selections of species of limited adaptability were based on the work of Thomas (1979), who established a vulnerability index based on the number of successional stages and plant communities used for feeding and reproduction. The fewer stages and communities used, the lower the index number. Those species with a low index number have narrower habitat requirements than those species with a higher number and are more vulnerable to habitat modification. The use of successional (seral) stages was adapted from Thomas (1979) and Meslow (1977). Information displayed in other columns may be based on subjective judgments made by persons knowledgeable with the SYUs.

In summary, the information presented in Table 2-5 lists selected species of the forest lands of the South Coast and Curry SYUs, some aspects of their life history, and what is known of the status of their population and habitat.

For a more complete list of species utilizing old-growth, mid-age or riparian zones for their optimum habitat, see Appendix F.

Fish

The large number of rivers passing through the planning area to the sea makes the SYUs extremely rich in anadromous fish habitat.

Habitat conditions have been degraded by past logging, road construction, fires and salvage treatments. As a result of improved timber management practices and reestablishment of vegetation, the overall condition of the fish habitat has improved.

Four species of salmonids utilize habitat in the SYUs. Steelhead trout populations are above recent historical averages. Chinook salmon, found in the larger streams, are close to recent historical average abundance. Cutthroat trout, both the resident and anadromous populations, are found at moderate population levels.

Table 2-5 Selected Terrestrial Vertebrates of the South Coast and Curry SYUs

	Species	Resident	Grass/Forb (Non-Stocked and 0-7 years)	Brush/Seedling (8-15 years)	Pole/Sapling (16-45 years)	Young 2nd Growth (46-115 years)	Mature (116-195 years)	Old Growth (196+ years)	Criteria of Significance	Population Status	Relative Abundance	Habitat Quantity	Habitat Quality
1	Goshawk Accipiter gentilis	B		O		O	OX	OX	2	D	R	D	P
2	Bald eagle Haliaeetus leucocephalus	B	O	O			OX	OX	1	I	U	S	F
3	Osprey Pandion haliaetus	B					X	X	5	S	U	D	F
4	Blue grouse Dendragapus obscurus	P	O	OX	OX	O	O	O	4	S	C	S	G
5	Ruffed grouse Bonasa umbellus	P		OX	X	O	OX	OX	4	S	C	S	G
6	Mountain quail Oreortyx pictus	P	O	OX	OX	OX	O	O	4	S	C	S	G
7	Band-tailed pigeon Columbia fasciata	B	O	O	O	O	OX	OX	4	S	C	S	F
8	*Spotted owl Strix occidentalis	P				O	OX	OX	1/2	D	R	D	G
9	*Saw-whet owl Aegolius acadicus	P					OX	OX	2	S	C	S	F
10	*Pygmy owl Glaucidium gnoma	P					OX	OX	2	S	C	S	G
11	*Vaux's swift Chaetura vauxi	B					OX	OX	2	S	C	D	G
12	Anna's hummingbird Calypte anna	P	O	OX					3/5	S	R	S	G
13	*Pileated woodpecker Dryocopus pileatus	P					OX	OX	2/5	D	U	D	F
14	Hammond's flycatcher Empidonax hammondii	B					OX	OX	2/5	S	U	S	G
15	*Tree swallow Iridoprocne bicolor	B	O	O		X	X	OX	5	S	C	D	F
16	*Brown creeper Certhia familiaris	P				O	OX	OX	2/5	S	U	D	F
17	Bewick's wren Thryomanes bewickii	P		OX	O				3/5	S	C	S	F
18	Hermit thrush Catharus guttatus	P				O	OX	OX	2/5	S	U	D	F
19	Orange-crowned warbler Vermivora celata	B		OX	O	O			3/5	S	C	S	G
20	Townsend's warbler Dendroica townsendi	W					O	O	2/5	S	U	D	F
21	Hermit warbler Dendroica occidentalis	B					OX	OX	2/5	S	U	S	F
22	Common yellowthroat Geothlypis trichas	B	O	OX					3/5	S	C	S	F
23	Red crossbill Loxia curvirostra	P				O	OX	OX	2	D	U	D	G
24	Savannah sparrow Passerculus sandwichensis	P	OX	O					3/5	I	A	I	G
25	Vesper sparrow Pooecetes gramineus	B	OX						3/5	I	U	I	F
26	*Yuma myotis Myotis yumanensis	P					OX	OX	2	D	C	D	F
27	*Long-eared myotis Myotis evotis	P	O	O	O	O	OX	OX	2	S	C	D	G

Table 2-5 Continued

	Species	Resident	Grass/Forb (Non-Stocked and 0-7 years)	Brush/Seedling (8-15 years)	Pole/Sapling (16-45 years)	Young 2nd Growth (46-115 years)	Mature (116-195 years)	Old Growth (196+ years)	Criteria of Significance	Population Status	Relative Abundance	Habitat Quantity	Habitat Quality
28	*Silver-haired bat Lasionycteris noctivagans	P	O	O	O	O	OX	OX	2	S	C	D	G
29	Brush rabbit Sylvilagus bachmani	P	OX	OX					3/4	I	A	I	E
30	Mountain beaver Aplodontia rufa	P	OX	OX					3	I	C	I	F
31	Northern flying squirrel Glaucomys sabrinus	P					OX	OX	2/6	D	C	D	F
32	Western red-backed vole Clethrionomys occidentalis	P						OX	2/6	S	C	D	G
33	Red tree vole Phenacomys longicaudus	P					OX	OX	2/6	S	C	D	G
34	Black bear Ursus americanus	P	O	OX	OX	OX	OX	OX	4	S	U	S	F
35	*Marten Martes americana	P			O	O	OX	OX	2/5	D	U	D	P
36	*Fisher Martes pennanti	P			O	O	OX	OX	2/5	D	R	D	P
37	River otter Lutra canadensis	P	OX	OX	OX	OX	OX	OX	4	S	C	S	F
38	Mountain lion Felis concolor	P	O	OX	OX	OX	OX	OX	4	I	R	S	P
39	Bobcat Felis rufus	P		OX	OX	OX	OX	OX	4	D	C	S	G
40	Roosevelt elk Cervus elaphus roosevelti	P	O	OX	OX	OX	OX	OX	4	S	C	S	F
41	Black-tailed deer Odoceileus hemionus columbianus	P	O	OX	OX	OX	OX	OX	4	S	C	S	F

Key

* Cavity User

Resident
P = Permanent
B = Breeding
W = Winter

Seral Stage
O = Feeding
X = Breeding

Criteria of Significance
1 = Threatened or Endangered
2 = Mature or old-growth dependent/or optimum habitat
3 = Early seral stage dependent/or optimum habitat
4 = Recreational or commercial value
5 = Species of limited adaptability
6 = Important prey speciecs of spotted owl

Population Status
I = Increasing
S = Stable
D = Decreasing

Relative Abundance
A = Abundant
C = Common
U = Uncommon
R = Rare

Habitat Quantity
I = Increasing
S = Stable
D = Decreasing

Habitat Quality
E = Excellent
G = Good
F = Fair
P = Poor

Special concern has been expressed for the coho salmon, whose population levels are depressed and declining. Because of its importance to the sport and commercial fishery, efforts are being made by State and Federal agencies to rehabilitate the coho salmon runs.

Many other species of fish are present in the SYUs. Sculpins, suckers, dace, squawfish and shiners are some examples. Little data on populations are available and none are of direct commercial or sport value. Some species may compete with trout and salmon for food and space, while others are used by the trout and salmon as food.

Table 2-6 lists population and habitat data for the important species of the SYUs.

Table 2-6 Cold Water Fish Habitat and Populations 1/

Species	Miles	Condition of Habitat Ex.	Good	Fair	Poor	Habitat Trend	Current Population	Population Trend
Cutthroat	392	11%	35%	37%	17%	Improving	Moderate	Stable
Steelhead	263	6%	44%	33%	17%	Improving	High	Stable
Chinook	92	0%	67%	30%	3%	Improving	Moderate	Increasing
Coho	250	6%	45%	33%	16%	Improving	Low	Declining

1/ Habitat miles, condition and trend are for BLM-administered lands only.

Threatened and Endangered Animals

There are six species of animals offically listed as threatened or endangered by the U.S. Fish and Wildlife Service and/or the State of Oregon that occur at least occasionally in the SYUs. Table 2-7 lists those species and their status.

The California brown pelican is frequently observed along the southern Oregon coast in the fall of the year (Personal communication, Blymyer 1979). The species is not known to breed in Oregon.

The first confirmed reports of the Aleutian Canada goose in Oregon were reported in October of 1979, near the New River in northern Curry County (Personal communication, Bartonek 1979).

The peregrine falcon is not known to nest in the EIS area, however, there have been repeated sightings in the coastal areas of the SYUs.

The bald eagle is a regular inhabitant of the SYUs. A survey conducted in 1979 reported a total of nine active nests in the Coos Bay BLM District. None of these nests were located on land administered by BLM. However there is one inactive nest located on BLM lands, and two active and one inactive nest are within 1/4 mile of BLM Lands.

The northern spotted owl is a permanent resident of the planning area. Currently there are 25 pairs known to utilize BLM-administered lands for some or all of their habitat needs. An additional 44 pairs are estimated on U.S. Forest Service lands in Coos and Curry counties. Other pairs existing on private lands are unknown but believed to be negligible (BLM, Coos Bay District personnel).

The western snowy plover is known from the New River Area of the SYUs, where they are generally associated with sandy beach type habitat.

No habitat considered critical under Section 7 of the Endangered Species Act of 1973 has been declared or nominated within the SYUs.

Table 2-7 Threatened and Endangered Species of the SCCSYUs

Species	Federal Status	Oregon Status
California brown pelican *Pelecanus occidentalis californicus*	E	E
Aleutian Canada goose *Branta canadensis leucacophalus*	E	E
Northern bald eagle *Haliaeetus leucocephalus alascanus*	T	T
Peregrine falcon *Falco peregrinus*	E	E
Western snowy plover *Charadrius alexandrinus nivosus*		T
Northern spotted owl *Strix occidentalis caurina*		T

T= Threatened
E= Endangered

RECREATION

Developed recreation sites on public land (See Figure 1-1) include Fawn Creek, Smith River Falls, Vincent Creek, Bear Creek, Sixes River, Palmer Butte, Loon Lake, East Shore, Cherry Creek, Burnt Mountain Cabin and Park Creek. Public recreation sites offer camping, picnicking and, in some cases, swimming opportunities. Use at these areas is light to moderate, except at Loon Lake. Loon Lake, with about 50,000 visits annually, offers boating, swimming, fishing and sightseeing opportunities as well as camping and picnicking.

Hunting and fishing are major recreational activities in the SCCSYUs. Big game hunting visitor use attributable to public land is significant. High quality big game hunting opportunities exist in the Burnt Mountain Cabin-Park Creek-Coos Mountain, Camp Creek drainage and Oxbow Burn areas. Use attributable to fishing and waterfowl hunting on BLM-administered lands is light, as most of the public lands do not front on the area's major rivers and lakes.

General sightseeing or driving for pleasure occurs as individuals travel along established roadways. Travel counts along major roads in the SCCSYUs indicate that about 994,500 visitor days were attributable to sightseeing. However, most of the use is in the coastal region and on access routes to the coast where public lands are limited. Many areas also offer high quality opportunities for specific botanical, geologic and/or wildlife sightseeing. High quality specific sightseeing areas include Oxbow Burn, Tioga Creek, Hunter Creek, Maria Jackson Park, Camp Creek, Loon Lake, Roman Nose Mountain and the New, Smith, Coquille and Sixes Rivers.

The SYUs also offer opportunities for berrypicking, mushroom gathering, firewood cutting and Christmas tree cutting. Vegetative collecting is a significant recreational activity in the SCCSYUs, although only about 7 percent of the use is attributed to public land.

The Sixes River recreation site offers recreational gold panning/dredging opportunities, although use is light. Off-road vehicle use opportunities on public land are limited as most BLM roads are paved or graveled, and cross country travel is curtailed by dense vegetation and steep terrain.

Table 2-8 summarizes visitation attributable to major recreation activities in the SYUs. Percentages of total resource area use attributed to BLM-administered land and recreational use projections for 1990 are also displayed.

CULTURAL RESOURCES

Federal agencies have been charged with responsibility for the cultural resources on lands under their jurisdiction. Through a group of laws beginning with the Antiquities Act (1906), BLM has been mandated to identify, protect and enhance such resources on public lands. A number of procedures were used to identify the cultural resources within the SCCSYUs.

Table 2-8 Estimated Current and Projected Visitation Attributed to Major Recreational Activities

Activity	Visits/Year (1977) Total	BLM	Percent Attributed to Public Lands	1990 Demand Projection [1] Visits/Year (BLM) Low	High
Hunting	51,100	8,020	16	9,470	9,920
Fishing	787,800	19,340	3	22,840	23,920
Camping	670,200	40,900	6	48,300	50,590
Picnicking	1,238,300	43,600	4	51,490	53,930
Power boating	117,900	7,800	7	9,210	9,650
Non-pool swimming	196,500	30,000	15	35,430	37,110
Collecting (vegetation)	53,500	3,500	7	4,130	4,330
Sightseeing [2]					
Total	3,115,300	153,160	—	180,870	189,450

[1] The low figures are based on the average growth of Coos, Curry and Douglas Counties (14.9 percent). The high figure is based on Oregon's population growth to 1990 (23.7 percent increase) (Portland State University 1976).

[2] Traffic counts along major roads indicate that about 994,500 visitor days (over 28,000,000 visits) were attributable to sightseeing.

The criteria used to assess the eligibility of identified cultural resources for inclusion in the National Register of Historical Places are described in 36 CFR 800.10. BLM employs a Cultural Resource Evaluation System (CRES) to stratify the relative value of an archeological or historical site in management terms.

Archeological Sites

There are presently 297 identified prehistoric sites within the SYUs. It is probable that more intensive surveys will result in the location of additional sites. Past surveys have tended to focus on the coastline and estuaries, overlooking the significant number of sites expected to be found in interior environments in the southern portion of the area.

Settlement patterns within the SCCSYUs have remained quite consistent throughout time, resulting in a concentration of both prehistoric and historic sites in the same vicinity. Environmental factors such as availability of food and water, benches or terraces, shelter from inclement weather and view of the surrounding terrain are the most important in site location. Trails are also located along long ridges. While most of the major settlements during both prehistoric and historic periods were located along the coastline or major river systems, a considerable number of related subsistence activities took place inland.

Types of sites found within the planning unit include semi-permanent village sites, trails and associated temporary campsites, stone hunting blinds, petroglyph sites, elk pit traps and vigil quest cairns and rings (see glossary).

While much of the EIS area has not been surveyed for archeologic sites, the Oregon Department of Transportation (1978) indicates that a potential high archeologic site density occurs along the Oregon coastal region. While interior sites are usually more dispersed, certain favorable inland locations (e.g., river valleys and basins) may also have as many as 5-10 sites per square mile. Further, it is probable that most of the unidentified sites are south of the Middle Fork of the Coquille River, where environmental factors encouraged utilization of much of the existing terrain. Steep terrain and dense vegetation north of the Middle Fork discouraged habitation in all but the most desirable locations (e.g., river terraces, upland meadows, major ridge systems).

While none of the archeological sites within the SCCSYUs are currently listed on the National Register, a number of sites have been identified as potentially eligible. The BLM is in the process of evaluating six prehistoric sites and plans to nominate those sites which meet the eligibility criteria for the National Register of Historic Places.

Historic Sites

There are 91 inventoried historic sites on or near BLM-administered land within the SYUs. Other sites will be added to the inventory as they are identified. The period of white settlement in the EIS area is marked by distinct phases of land use and tenure. There are no historic sites more than 150 years old.

Most sites are significant for their association with particular phases of economic and social development rather than for specific events or persons. Initial historic settlement of the SCCSYUs was characterized by widely dispersed homesteads located in river valleys or on upland prairies and meadows. Many of these homesteads have been reclaimed by forest, leaving only remnants of cabins, corrals and/or refuse pits. Historic timber harvesting practices also left evidence of railroads, camps, plank roads, splash dams and refuse deposits.

While the EIS area does contain historic sites listed on the National Register, none of these sites are on BLM-administered land. The BLM is in the process of evaluating seven historic sites on public land and plans to nominate those sites which meet the eligibility criteria for the National Register of Historic Places. The BLM also has plans to encourage owners of certain significant historic sites adjacent to public land to approve nomination of these sites to the National Register. Cooperative agreements for preservation and maintenance are being initiated for some other privately-owned sites near public land.

Historic sites are protected by the same stipulations as archeological sites, and a thorough survey to identify them so they can be protected must be accomplished before ground disturbance or ownership changes can occur.

Paleontology

Vetebrate, invertebrate and plant fossils are known to occur even though the SYUs have not been thoroughly surveyed. Fossil shells are abundant in the sedimentary rocks of the Coos Bay area. Names, descriptions and illustrations of the fossils characteristic of the sedimentary formations in the Coos Bay area can be found in Dall 1909; Howe 1922; Turner 1938; Weaver 1942, 1945; and Steere 1955.

None of the known fossils within this area are of remarkable scientific interest. However, it is required that all reports of fossil-bearing deposits be checked by qualified personnel to avoid destruction of such resources.

VISUAL RESOURCES

The visual resource management (VRM) inventory and evaluation comprise an integral part of multidisciplinary planning (BLM Manual 8400). Three factors are considered in developing visual resource management objectives which specify the amount of modification the natural landscape can sustain. These three factors are the inherent scenic quality of the landscape, the visual sensitivity the public has for the landscape, and the visual distance (whether the landscape can be seen as foreground-middleground, background, or is seldom seen from a travel route or sensitivity area).

Key factors for rating the scenic quality of the visual resource on BLM-administered land in the SCCSYUs include landform, vegetation, water, color, scarcity and cultural modifications (BLM Manual 8411). Three scenic quality classes (A, B and C) reflect the degree of variety or monotony inherent in the landscape. Class A scenery contains outstanding feature attractions and distinctive variety. Examples of Class A scenery within the SYUs include coastal dunes and headlands, portions of the Smith, Umpqua, Rogue and Chetco River valleys, Loon Lake, Bosley Butte, summit and south face of Roman Nose Mountain and a number of waterfalls.

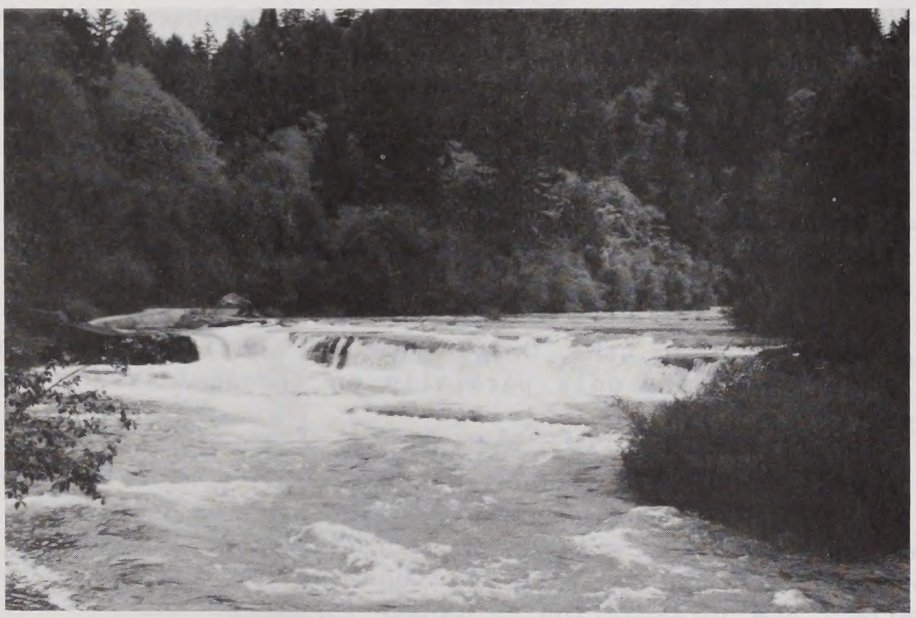
Visual sensitivity levels indicate the relative degree of user interest in visual resources and concern for changes in the existing landscape character. Criteria for visual sensitivity level determinations include user volume, user concern, zone of influence and special interest group concern. These criteria recognize that the public expresses interest and concern for visual resources. Sensitivity is classed as high, medium or low.

Examples of high sensitivity areas within the SYUs include U.S. Highway 101, State Highways 38, 42, 138, Powers Highway, Mill Creek County Road, Umpqua, Rogue and Chetco River valleys, coastal State parks, LaVerne County Park and Loon Lake.

Visual distance zones relate to seen land surfaces as observed from public access routes or sensitivity areas. Public land in the SCCSYUs is visible from U.S. Highway 101, State Highways, county roads and BLM roads. Recreation use areas with visible public land occur at Loon Lake, Smith, Umpqua, Sixes, Rogue, and Chetco Rivers, some State and county parks, BLM recreation sites and Pacific Ocean beaches. BLM-administered lands are also visible from a number of communities and rural residences within the SYUs.

Three categories of visual distance zones are used: foreground-middleground, background and seldom-seen. Within the SYUs, the foreground-middleground is essentially the seen land surface area within 3 miles of an observer. Within this zone, management activities can be viewed in detail under conditions of average visibility. Frequent rain and summer fog restrict visibility to the foreground-middleground zone for more than 50 percent of the time. Within the SYUs, background is that area in view from 3 miles to about 12 miles. In the background, management activities are less discernible to an observer due to distance and atmospheric conditions, such as high humidity and frequent precipitation characteristic of the Oregon Coast Range and Klamath Mountains. Areas not identified as foreground-middleground or background are classed as seldom-seen.

Figure 2-3 shows scenic quality, sensitivity levels and visual distance zones for the SCCSYUs.



Smith River Falls: A highly scenic resource.

WILDERNESS VALUES

Under the terms of the Federal Land Policy and Management Act of 1976 (FLPMA), roadless areas of 5,000 acres or more that have wilderness characteristics are to be reviewed within 15 years for possible wilderness designation. The 1976 Act also states that in the event of inconsistency between it and the O&C Act insofar as they both may relate to management of timber resources, the O&C Act prevails. Accordingly, the wilderness review provisions do not apply to revested Oregon and California Railroad Grant lands and reconveyed Coos Bay Wagon Road Grant lands suitable for sustained yield management as commercial timber lands.

The wilderness review for BLM-administered lands in Oregon and Washington has begun. In March 1980, the Oregon State Director announced his proposed decision for public lands in the EIS area included in the intensive wilderness inventory. Both North Sisters Rocks and Zwagg Island are proposed wilderness study areas. A final decision will be made on these areas in fall 1980 following the close of a 90-day public comment period.

The intensive wilderness inventory and accompanying maps for Oregon and Washington are available in the Oregon State Office.

ECOLOGICALLY SIGNIFICANT AREAS

Two myrtlewood timber stands are currently reserved for the protection of their recreational and scenic values (Secretary's Order, November 8, 1946). Over the past 30 years, however, both sites have experienced degradation due to windstorm damage, logging practices and road construction.

The Cherry Creek Research Natural Area was established to preserve a Douglas-fir/western hemlock forest growing on sedimentary soils in the Coast Range. The management objective for the Cherry Creek Research Natural Area is to prevent unnatural encroachments and activities which directly or indirectly modify ecological processes on the tract. Logging is not allowed nor is public use which threatens significant impairment of scientific or educational values. Cherry Creek Research Natural Area contains 590 roadless acres. An additional 950 roadless acres surround the site in a narrow elongated shape. In 1979, the area was inventoried and determined not to have wilderness characteristics.

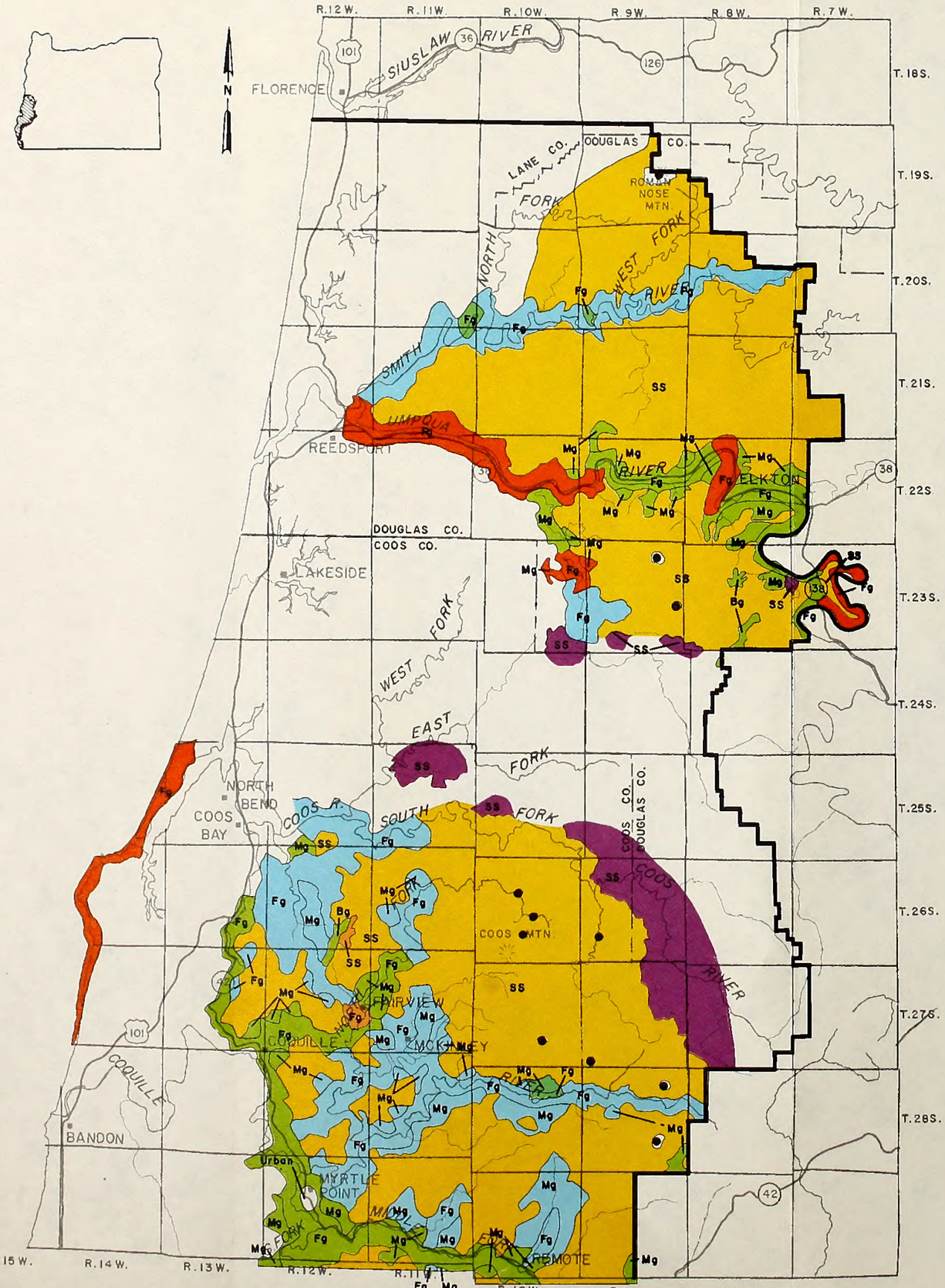
Ten sites, identified by the Oregon Natural Heritage Program as being ecologically valuable, are only partially on BLM-administered land (Nature Conservancy 1977).

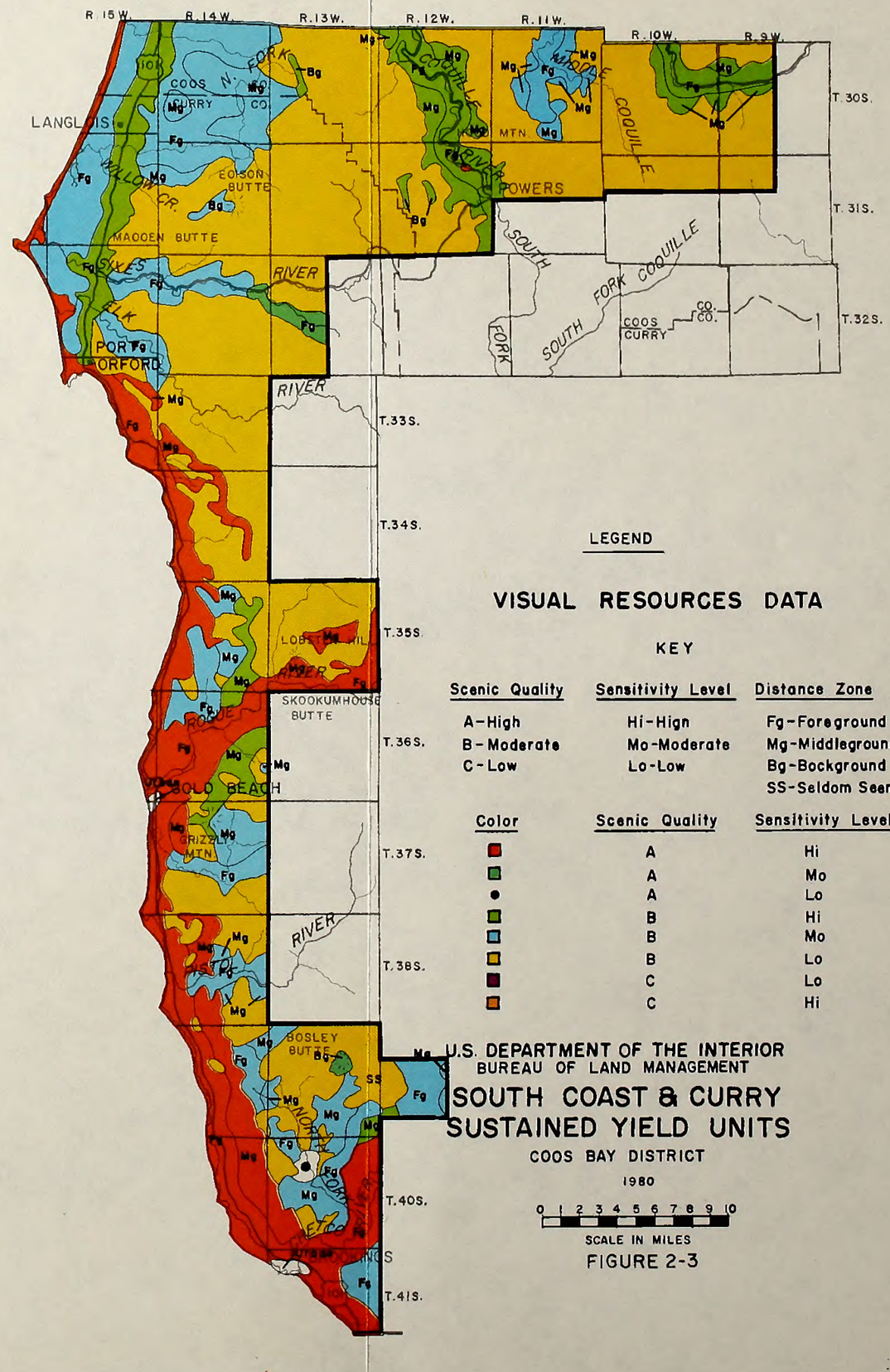
Five sites containing public land within the SCCSYUs have been identified as potential National Natural Landmarks (Chilcote et al. 1976; Easterbrook 1978). Designation of a site as a National Natural Landmark under this program, administered by the Heritage Conservation and Recreation Service, would not affect BLM jurisdiction to manage the area.

Table 2-9 lists areas identified as ecologically significant within the SYUs.

NORTH HALF

SOUTH HALF





LEGEND

VISUAL RESOURCES DATA

KEY

Scenic Quality	Sensitivity Level	Distance Zone
A-High	Hi-Hign	Fg-Foreground
B-Moderate	Mo-Moderate	Mg-Middleground
C-Low	Lo-Low	Bg-Bockground
		SS-Seldom Seen

Color	Scenic Quality	Sensitivity Level
■	A	Hi
■	A	Mo
●	A	Lo
■	B	Hi
■	B	Mo
■	B	Lo
■	C	Lo
■	C	Hi

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SOUTH COAST & CURRY SUSTAINED YIELD UNITS

COOS BAY DISTRICT

1980

0 1 2 3 4 5 6 7 8 9 10
SCALE IN MILES

FIGURE 2-3

Table 2-9 Ecologically Significant Areas on Public Land

NAME/NUMBER	DESCRIPTION	REFERENCE
Timber Preserve Areas		
1. Myrtlewood Preserve	Recreational and scenic quality severely degraded	Secretary's Order November 8, 1946
2. Myrtlewood Preserve	Recreational and scenic quality severely degraded	Secretary's Order November 8, 1946
Research Natural Areas		
1. Cherry Creek 1/ (CS-75)	Old-growth Douglas-fir/western hemlock	J.F. Franklin et al. 1972
Potential National Natural Landmarks		
1. Humbug Mountain-Sisters Rock	Outstanding headland of mid-Mesozoic massive conglomerate. Good example of shoreline processes, volcanic activity and geologic structure	D.T. Easterbrook and S.L. Marsh 1978
2. Upper Camp Creek	Various older forest communities	Chilcote et al. 1976
3. Port Orford Cedar Township	Old-growth Douglas-fir with Port-Orford-cedar and western hemlock	Chilcote et al. 1976
4. Hunter Creek Bog 2/ (CU-57)	Closest Darlingtonia bog to the coast on ultrabasic parent material (serpentine); rare plants	Chilcote et al. 1976

Identified by Oregon Natural Heritage Program (Nature Conservancy 1977)

1.	Ash Valley, Soup Creek	DO-38	Critical Elk winter range
2.	Wassen Creek and Lake	DO-44	Large, remote timbered watershed
3.	Burnt Ridge Old Forest	DO-94	Older Douglas-fir/western hemlock
4.	Seven Devils Ancient Marine Terrace	CS-1	Blacklock soil, pygmy forest second growth sitka spruce
5.	Coos River	CS-80	Bald eagle nest (inactive 1974)
6.	Salt Lick Prairie	CU-9	Band-tailed pigeon
7.	Grizzly Mountain	CU-97	Great blue heron rookery
8.	South Coast Herbland below Euchre Creek	CU-100	Ocean front herb-dominated dunes

1/ Cherry Creek has also been identified by the Oregon Natural Heritage Program (Nature Conservancy 1977) and is a potential National Natural Landmark (Chilcote et al. 1976).

2/ Hunter Creek Bog has also been identified by the Oregon Natural Heritage Program (Nature Conservancy 1977).

SOCIOECONOMIC CONDITIONS

The South Coast and Curry SYUs occupy parts of Lane, Douglas, Coos and Curry counties. (See Table 1-1.) Although only a small portion lies within Lane County, 10 percent of the timber harvested from the public lands in the SYUs is consumed by mills in Lane County. Management actions in the SYUs are therefore considered to be of potential economic significance to all four counties.

About 440,000 people lived in this area in 1979, as shown in Table 2-10. Over 60 percent were located in Lane County. Population growth has been generally stronger since 1970 than in the previous decade.

In Table 2-11, labor force and employment data has been averaged over a 4-year period, 1976-1979, to show representative information free from the distortion of year-to-year variations. The timber industry is the principal support of most of the area, and makes up the major part of the manufacturing industry in all counties.

Unemployment rates are typically higher than the State average in these counties. A review of annual data for the years 1972 through 1979 showed that unemployment rates for the area averaged 16 percent higher than the State rate (8.8 percent versus 7.6 percent) and that the rate in none of the four counties was ever below the State unemployment rate (Oregon Department of Human Resources, 1973-1980). During April 1980, unemployment rates by county were: Coos, 11.6 percent; Curry, 15.6; Douglas, 12.4; and Lane 10.1; as compared with the State average of 8.0 percent (Oregon Department of Human Resources, personal communication).

These high unemployment rates are primarily attributable to the dependence of the local economy on the timber industry which is subject to both seasonal and cyclical fluctuations and is experiencing long-term decline. Seasonal variation in timber industry (lumber and wood products) employment averaged 2,891 workers between January and August each year over the period 1972 through 1979 in the four-county area. This variation amounted to 56 percent of the average seasonal variation (5,087) in total unemployment.

The effect of cyclical variation in the industry on the local unemployment situation is represented by the annual data charted in Figure 2-4. Changes in wood products employment are smaller, but correspond in time and direction with all changes in unemployment.

The long-term downward trend of timber industry employment is indicated in Figure 2-4 by the general slope of the graphed data. The reasons for current and prospective declines in timber employment are discussed in the section on the timber industry below.

Table 2-10 Population, 1960-1979

County	1960	1970	1979	Annual Growth Rate 1960-70	Annual Growth Rate 1970-79
Coos	54,955	56,515	63,500	0.3	1.3
Curry	13,983	13,006	17,150	-0.7	3.1
Douglas	68,458	71,743	89,300	0.5	2.5
Lane	162,890	215,401	269,300	2.8	2.5
Total	300,286	356,665	439,250	1.7	2.3

Source: 1970 Census of Population; Portland State University, 1980

Table 2-11 Labor Force and Employment, Average 1976-79

Category	Coos	Curry	Douglas	Lane	Total
Civilian Labor Force	26,028	6,208	37,545	119,925	189,706
Unemployment	2,330	595	3,450	10,175	16,550
Unemployment Rate	9.0	9.6	9.2	8.5	8.7
Total Employment	23,698	5,613	34,095	109,750	173,156
Wage & Salary Employment	20,722	4,495	30,340	97,825	153,382
Manufacturing	6,000	1,343	10,478	20,475	38,296
Timber 1/	5,198	1,126	8,986	14,597	29,907
Non-manufacturing	14,722	3,152	19,862	77,350	115,087

1/ Includes lumber and wood products (SIC 24) and pulp, paper and board (SIC 26). Omits workers in forest management activities classified as forestry, business services, and other industries. Partially estimated data for 1979 were used to calculate 1976-79 average.

Source: Oregon Department of Human Resources, 1977, 1978, 1979, 4/15/80, 6/25/80.

While wood products employment has shown a declining tendency over the 1972-79 period, population (and the labor force) has grown. Although unemployment has increased as well, most of the increase in the labor force is represented by an increase in employment in other industries. In Figure 2-4 the changes in other employment (all employment except lumber and wood products) are shown so that they can be compared with the changes in lumber and wood products employment and the changes in total unemployment. Other employment increased by 35,263 workers between 1972 and 1979, while unemployment increased by 5,330 and wood products employment declined by 2,180. Lumber and wood products employment was 21 percent of total employment in 1972 but only 16 percent in 1979.

EMPLOYMENT TRENDS, 1972-79

(Combined Data for Coos, Curry, Douglas and Lane Counties)

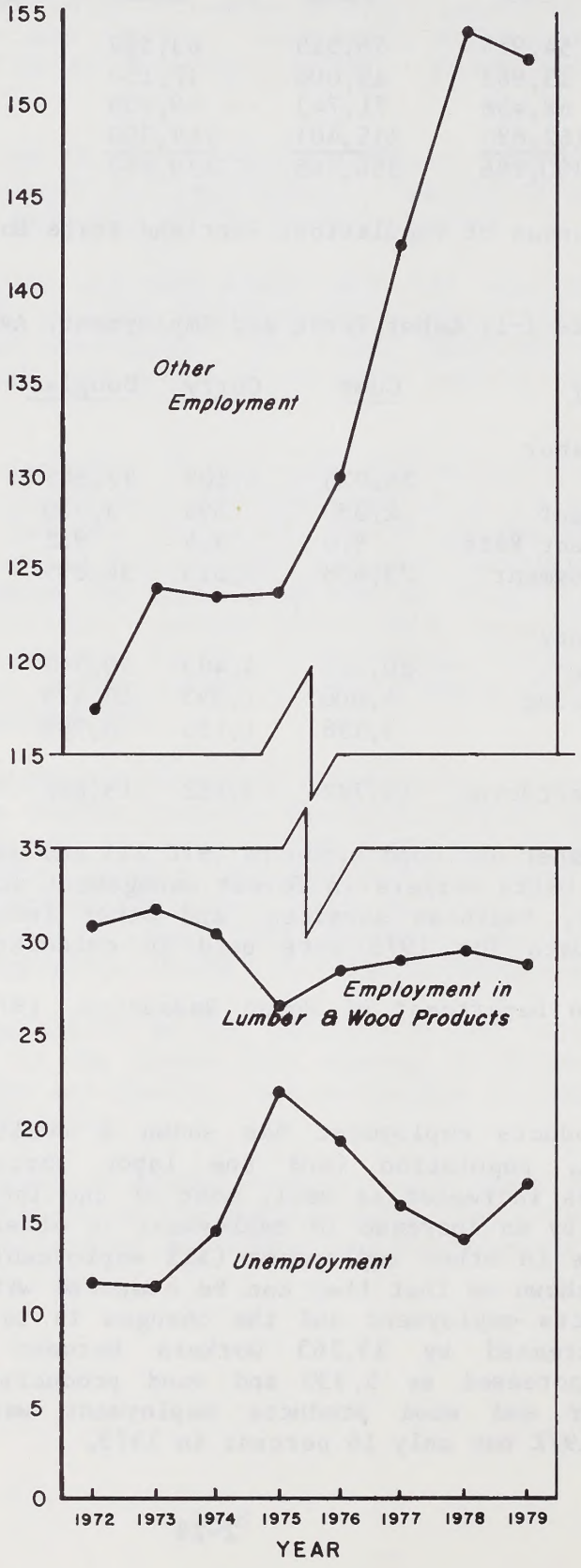


Figure 2-4

Personal income for 1976 through 1978 is shown in Table 2-12. Per capita income is below the State average in each of the counties.

Table 2-12 Personal Income[1/], Total and Per Capita, 1976-78

County	Total (in millions) 1976	1977	1978	Per Capita 1976	1978	1979
Coos	$ 339.5	$ 397.8	$ 452.7	$5,653	$6,513	$7,251
Curry	81.4	96.2	111.4	5,645	6,367	7,127
Douglas	478.5	551.9	624.5	5,779	6,359	7,013
Lane	1,416.4	1,674.8	1,913.0	5,833	6,696	7,423
Total	$ 2,315.8	$ 2,718.7	$ 3,101.6	$5,788	$6,586	$7,301
State	$14,930.1	$17,184.5	$19,735.9	$6,419	$7,207	$8,076

1/ Labor and proprietors' income is used to represent worker earnings instead of personal income which includes payments not directly attributable to individual production. Labor and proprietors' income in 1978 (in millions) was: Coos, $349.8; Curry, $74.9; Douglas, $492.4; Lane, $1,466.3; totaling $2,383.5 for the four counties.

Source: U.S. Department of Commerce, Bureau of Economic Analysis 1980

Estimates of earnings per worker in all industries have been calculated by dividing total labor and proprietors' income (Bureau of Economic Analysis data) by total employment (Oregon Department of Human Resources). Earnings per worker in 1978 for all industries and for the timber industry (including pulp, paper and board) based on covered employment data (Oregon Department of Human Resources, 1980) were as follows:

County	All Industries	Timber
Coos	$13,893	$17,681
Curry	11,865	17,196
Douglas	13,941	17,634
Lane	12,565	17,410

Timber Industry

The economic importance of the timber industry to local communities is shown in Table 2-13. Workers' earnings which are spent locally generate additional local income. The process by which additional income (termed indirect income) is created through successive rounds of expenditures following the initial receipt of income by a specific economic sector (direct income) is called a multiplier effect. Estimates of the total income generated in local

areas due to the multiplier effect on workers' earnings (direct income) in the timber industry are shown in Table 2-13. The total employment generated was determined by dividing the income estimates by average earnings per worker.

Table 2-13 Earnings and Employment Generated by the Timber Industry 1/, 1978

	Coos	Curry	Douglas	Lane
Worker earnings in the timber industry 2/	$ 93,904,294	$ 20,428,698	$158,332,405	$256,463,525
Earnings multiplier 3/	2.044	1.625	1.775	2.166
Total earnings generated	$191,900,000	$ 33,200,000	$281,000,000	$555,500,000
Average earnings per worker-all industries 4/	$13,893	$11,865	$13,941	$12,565
Total employment generated	13,800	2,800	20,200	44,200
Percent county total	55%	44%	57%	38%

1/ Includes lumber and wood products (SIC 24) and pulp, paper and board SIC 26) industries. Omits workers in forest management activities classified as forestry, business services, and other industries.

2/ Earnings in employment covered by unemployment insurance. Oregon Department of Human Resources, 1980.

3/ USDI, BLM (DYRAM) 1978b. Adjusted by a factor of 1.16 to reflect earnings of proprietors omitted from earnings in covered employment. For basis, see Appendix I, Jackson-Klamath FEIS (USDI, BLM 1979b).

4/ Total earnings generated is divided by average earnings in all industries to estimate the total employment generated. This estimation method tends to overstate employment slightly because worker earnings in the timber industry which accounts for the major part of the total income generated are substantially above average earnings.

Timber is often milled in a different county than that in which it was logged. As a basis for estimating the amount and location of economic activity generated by timber harvesting, log flows in 1976 (the most recent year for which data is available) are shown in Table 2-14.

The log flow information relating the county where the timber was harvested to the county where the timber was processed is necessary in the calculation of employment ratios relating employment to timber production.

As shown in Table 2-15, logging employment for a benchmark year was estimated using employment ratios (employment per MM bd. ft. harvest) developed by Wall (USDI, BLM 1978a). Logging employment was deducted from total timber industry employment, and the ratio of this remaining employment to timber consumption was calculated to obtain employment (except logging) per MM bd. ft. of consumption.

Table 2-14 Log Flows by County, 1976 (Millions of board feet)

Origin	Using (Processing) County					
	Total	Coos 1/	Curry	Douglas	Lane	Other
Coos	697.1	606.3	9.9	56.0	23.5	1.4
Curry	269.5	78.4	153.5	33.9	-	3.7
Douglas	1,538.4	199.4	0.1	1,062.0	221.9	55.0
Lane	1,684.9	2.1	-	23.0	1,596.0	63.8
Other area	265.9	10.5	12.8	88.1	154.5	-
Total	4,455.8	896.7	176.3	1,263.0	1,995.9	123.9

1/ Coos County log use includes 151.6 MM bd. ft. log exports. Deducting exports from total log use, log use by Coos County industry is considered to be 745.1 MM bd. ft.

Source: Howard and Hiserote 1978. All data converted to Scribner log scale based on 16 foot logs rather than 32 foot logs by use of a factor of 1.124.

Table 2-15 Timber Industry Employment per Million Board Feet (1976 data)

	County			
	Coos	Curry	Douglas	Lane
Total timber industry employment 1/	4,962	1,080	9,083	14,371
Estimated logging employment:				
Timber harvest (MM bd. ft.) 2/	563.2	176.4	1,470.5	1,328.1
Logging empl. / MM bd. ft. harvest 3/	1.486	1.486	1.486	1.415
Logging employment	837	262	2,185	1,879
Remainder of industry employment	4,125	818	6,898	12,492
Timber consumption (MM bd. ft.) 4/	745.1	176.3	1,263.0	1,995.9
Employment per MM bd. ft. consumption	5.54	4.64	5.46	6.26

1/ Total covered employment in the lumber and wood products industry (SIC 24) and pulp, paper and board (SIC 26). (Oregon Department of Human Resources 1980).

2/ Lloyd 1978. Data converted to 16-foot log base by applying factor of 1.124.

3/ USDI, BLM 1978a. Ratios adjusted for difference in log scale base.

4/ Table 2-14.

Using the estimation methods set forth above, employment and income attributable to timber harvested from the South Coast and Curry SYUs may be calculated. Timber harvests for the SYUs for a 5-year period, 1975-1979, were averaged (Table 2-16), and the distribution of this average harvest to industry users in the several counties and elsewhere was estimated in accordance with the distribution of the SYUs' harvest in each county in 1975 and 1976. (See Table 2-17).

Table 2-16 BLM Timber Harvest, SCCSYUs, 1975-79
(Millions of board feet)

Year	Coos	Curry	Douglas	Total
1975	109.7	1.0	26.4	137.2
1976	158.8	5.3	92.1	256.2
1977	159.9	3.6	113.4	276.8
1978	158.4	0.7	37.7	196.8
1979	132.8	10.4	87.9	231.1
1975-79 Average	143.9	4.2	71.5	219.6

Table 2-17 Estimated Distribution of Average
SCCSYUs Harvest to County of Use 1/
(Millions of board feet)

County of Use	Harvest County			Timber Consumption
	Coos	Curry	Douglas	
Coos	91.2	-	19.2	110.4
Curry	1.2	4.2	-	5.4
Douglas	32.0	-	39.4	71.4
Lane	10.9	-	11.2	22.1
Other	8.6	-	1.7	10.3
Total	143.9	4.2	71.5	219.6

1/ Average annual timber harvest (1975-79) in each county distributed to using counties in proportion to 1975-76 average distribution for SYUs.

Timber industry employment and earnings and total employment and earnings generated by the 1975-79 average harvest are shown in Table 2-18. These estimates are compared with 1978 data for each county to indicate the relative importance of SYUs' timber harvests to local communities. South Coast and Curry SYUs' harvests are most important to Coos County where they account for about one-sixth of timber industry employment and about 9 percent of total county earnings and employment. In the four counties taken together, the SYUs harvests account for about 5 percent of timber industry employment and support about 2 percent of total earnings and employment.

A 1976 study of timber prospects in Oregon timbersheds concluded that harvest levels of the 1968-73 period in the South Coast timbershed (Coos and Curry Counties) could be sustained until 1995 but could fall as much as 35 percent after 1995 because of a decline in forest industry harvest. Essentially, level harvests from Federal, State and other public ownerships through the year 2005 are assumed in the projection (Beuter et al. 1976).

Table 2-18 Employment and Earnings Generated by SCCSYUs' Harvest
(Based on 1975-79 average harvest)

Item	Coos	Curry	Douglas	Lane
Timber harvest (MM bd. ft.) 1/	143.9	4.2	71.5	-
Logging employment ratio 2/	1.486	1.486	1.486	1.415
Logging employment	214	6	106	-
Timber consumption (MM bd. ft.) 1/	110.4	5.4	71.4	22.1
Employment ratio 2/	5.54	4.64	5.46	6.26
Other timber employment	612	25	390	138
Employment in timber industry	826	31	496	138
Percent 1978 county total	16%	3%	6%	1%
Av. earnings/timber worker (1978) 3/	$17,681	$17,196	$17,634	$17,410
Earnings in timber industry (x 1,000)	$14,605	$ 533	$ 8,746	$ 2,403
Multiplier 4/	2.044	1.625	1.775	2.166
Total earnings generated (x 1,000)	$29,853	$ 866	$15,525	$ 5,204
Percent 1978 county total	9%	1%	3%	5/
Av. earnings/worker - all industries	$13,893	$11,865	$13,941	$12,565
Total employment generated	2,149	73	1,114	414

1/ From Table 2-17. Timber harvest consumed outside the area is omitted.
2/ From Table 2-15. Ratios not adjusted for productivity gains between 1976 and 1978.
3/ See text concerning personal income.
4/ From Table 2-13.
5/ Less than 0.5 percent.

Timber industry employment is expected to decline over the next several decades despite sustained harvest levels because of increasing productivity. Projections of falling employment per unit of timber employment are presented by Wall in the Josephine FEIS (USDI, BLM 1978a). Projections of employment to the year 2000 made by Bonneville Power Administration (U.S. Dept. of Energy 1979) show declining timber industry employment after 1980 in each of the counties (Coos, Curry, Douglas and Lane) although total employment in each county is projected to continuously increase.

Fisheries

The fish populations dependent on the rivers in the EIS area are a significant economic resource. Table 2-19 shows the income and employment generated by fishing activities. This income and employment includes the earnings and employment of the commercial fishery and income and jobs arising from the trip expenditures of sport anglers. A major part of this activity occurs outside the EIS area because salmon may be caught far from their spawning area.

Table 2-19 Income and Employment Generated by the Commercial Fishery and Trip Expenditures of Sports Anglers
(Annual values, 1975 prices)

Species	Present Conditions		Optimum Conditions 1/	
	EIS Area	Public Lands Habitat 2/	EIS Area	Public Lands Habitat 2/
Cutthroat Trout	$ 800	$ n.a.	$ 3,100	$ n.a.
Winter Steelhead	54,600	17,400	164,700	52,600
Coho Salmon	137,100	29,200	287,800	61,200
Chinook Salmon	64,100	9,700	106,100	16,100
Total	$256,600	$56,300	$561,700	$129,900
Employment 3/	20	4	44	10

1/ Optimum conditions represent estimates of levels considered attainable with favorable physical, political and biological conditions.
2/ Represents fish habitat on lands managed by BLM within the EIS area including O&C lands and Coos Bay Wagon Road lands.
3/ Estimated by dividing income generated by average income per worker in the State in 1975 ($12,669).

Source: USDI, BLM Coos Bay District 1978c.

Terrestrial Wildlife

Terrestial wildlife in the Coos Bay District provides a basis for hunting and some trapping activity. In 1975 these activities generated $870,800 of personal income in local communities and nearly twice as much personal income elsewhere in the Pacific Northwest region (USDI, BLM 1978c). About $215,100 in local income was attributed to hunting on BLM-administered lands. In terms of local employment, the local income generated was estimated to represent 73 jobs with 18 of these attributable to BLM-administered lands (Ibid). Hunting activity (and associated income and employment) is projected to increase 20 percent by 1990.

Fur trapping is a minor activity with an estimated yield value of $27,600 in 1975 including $5,600 attributable to BLM-administered lands (Ibid).

General Recreation

Visitation attributed to recreational activities is estimated in the Recreation section. Recreational visits other than hunting and fishing to sites or areas of the type provided by BLM are estimated to total 2,276,400 in 1977 with 125,800 of these attributed to public lands managed by BLM. Average expenditures in 1975 were estimated to be $5.36 per day, and local personal income generated by multiplier effects of these expenditures are estimated to total 29.6 percent of the expenditures (USDI, BLM 1978c). Personal income accruing to Coos, Curry and Douglas counties from these recreational visits is thus estimated to amount to $3,611,000 in total with $199,600 attributable to public lands managed by BLM. Sightseeing activity amounted to the equivalent of 994,500 visitor days (Table 2-8 Recreation Visitation) and generated $1,578,000 in personal income. The portion attributable to BLM lands has not been determined. Recreation activities are projected to increase between 15 and 24 percent from 1975 to 1990.

Public Finances

Payments are made to State and local governments from land management revenues and, in a minor amount, from appropriations. In the EIS area, such payments arise from three different land categories: O&C lands, Coos Bay Wagon Road (CBWR) lands, and other BLM-administered lands (public domain). Most of the revenues derived from these lands are from timber sales.

Fifty percent of the revenue from all O&C lands in the State are distributed among the counties with O&C lands in proportion to the 1915 assessed value of the O&C lands in each county. Total O&C revenues for the fiscal year ending September 30, 1979 were $193,548,297 of which $34,473,942, or 18 percent, came from lands administered by BLM within the EIS area. Table 2-20 shows the importance of the O&C revenue distribution to individual counties in terms of property tax equivalents. The table also indicates the wide year-to-year variations in O&C revenues caused by the variations in harvest rates reflecting national housing start fluctuations.

Payments are made to local governments from CBWR land revenues in the form of in-lieu timber severance and property taxes. Severance tax payments are distributed to local tax districts in accordance with timber assessed values on CBWR lands prior to the institution of the severance tax. In-lieu property taxes are calculated at levy rates on the assessed value of land only. Table 2-21 shows the distribution of these payments in Coos County.

A net of four percent of revenues from public domain lands are remitted to state governments. These revenues in Oregon are distributed to counties on the basis of total land areas for the benefit of county roads and bridges. Total revenues from such lands in the EIS area were $1,200,691 in FY 1979 resulting in the distribution of minor amounts among Oregon's 36 counties.

Table 2-20 O&C Revenue Distribution to Counties Expressed as Property Tax Rate Equivalent and as Percent Supplement To Total Levy, Fiscal Years 1976-1979

County	Amount per $1,000 Assessed Value 1/				Percent Supplement to Levy 2/			
	1976	1977	1978	1979	1976	1977	1978	1979
Benton	$2.31	$3.36	$2.26	$2.03	9.1	21.9	12.3	12.4
Clackamas	1.07	1.69	1.17	1.01	4.0	6.8	5.4	5.5
Columbia	1.38	2.20	1.77	1.86	8.9	15.2	12.7	13.0
Coos	4.14	6.59	5.32	4.81	16.0	30.9	31.9	29.0
Curry	8.41	13.27	9.81	8.38	44.8	120.2	102.1	92.9
Douglas	9.04	14.47	12.44	11.59	57.6	90.0	110.3	103.8
Jackson	6.18	9.78	6.90	5.85	28.2	50.5	39.3	41.2
Josephine	12.01	18.23	11.78	10.04	60.6	119.1	74.4	89.8
Klamath	1.56	2.47	1.85	1.73	10.5	17.3	13.4	13.7
Lane	2.53	3.92	2.91	2.48	10.2	17.1	14.1	13.6
Lincoln	0.31	0.45	0.40	0.33	1.8	3.4	2.5	2.2
Linn	1.13	1.77	1.39	1.37	5.2	9.4	8.2	8.5
Marion	0.41	0.62	0.43	0.39	1.5	2.6	2.0	2.0
Multnomah	0.08	0.13	0.09	0.82	0.3	0.5	0.4	0.4
Polk	2.55	3.91	2.75	2.43	9.9	16.2	13.6	13.1
Tillamook	0.94	1.38	1.14	1.03	5.0	8.2	7.7	6.4
Washington	0.12	0.19	0.13	0.11	0.5	0.8	0.6	0.6
Yamhill	0.69	1.09	0.75	0.67	2.8	4.9	3.7	3.6
Average	2.16	3.01	2.19	2.54	7.9	13.6	10.9	10.9

1/ Represents county O&C distribution for fiscal year divided by total assessed value (in thousands) on January 1 of same calendar year. For 1976 the fiscal year ended June 30, 1976; later data are for years ending September 30.

2/ Represents O&C distribution as percent of total property tax levy for following year, e.g., FY 76 distribution as percent of 1976-77 levy.

Source: USDI, BLM 1978b. BLM Facts-Oregon and Washington, 1979, 1980; Oregon Dept of Revenue, Oregon Property Tax Statistics, 1978; Oregon Dept. of Revenue, Dick Yates, telephone conversations, April 15, 1980, June 24, 1980.

Table 2-21 In-Lieu Tax Payments on CBWR Lands Administered by BLM, Coos County 1/

Tax District	Severance Tax FY 1979	Property Tax 1979-80	Combined Amounts	Percent of Tax Dist. 79-80 Levy
Coos County	$ 40,961	$ 3,215	$ 44,176	5.6
Coos County Ed. Serv.Dst.	17,555	2,775	20,330	3.0
SW Oregon Comm. Coll.	40,961	6,603	47,564	2.9
School Dist. #8	35,536	11,067	46,603	3.6
School Dist. #9	58,016	7,342	65,358	1.5
School Dist. #41	331,850	15,767	347,617	60.5
Port of Bandon	120	100	220	0.6
Port of Coos Bay	1,278	152	1,430	0.6
Port of Coquille	2,096	149	2,245	45.4
Sumner Rural Fire Dist.	1,430	-	1,430	7.2
Bay Area Hospital	3,225	270	3,495	0.8
Coquille Valley Hospital	1,443	246	1,689	5.9
Total	$ 534,473	$47,685	$582,158	-

1/ Payments in-lieu of taxes are made to the county treasurer and distributed to tax districts. Severance taxes paid during the year ending September 30, 1979 are combined with 1979-80 property tax levies and compared with the total 79-80 levy for each district.

Source: Coos County Assessor; Coos County Treasurer; BLM Facts 1979-80.

Local Income Attributable to BLM-Administered Lands

In summary, the principal sources of local personal income arising from lands administered by BLM in the SCCSYUs are:

Timber	$51,448,000
Fishing	56,300
Hunting	215,100
Other recreation	199,600
	$51,919,000

This amount omits the in-lieu tax payments and other BLM-generated revenues accruing directly to the local governments in the area.

Social Concerns

Timber, as the main economic support of the local economy, greatly influences social attitudes and concerns of residents. Individual economic welfare is closely related to the welfare of the timber industry. The fluctuations of the industry have made people adaptable to changes in their welfare, but the threat of a major reduction in the timber supply (and employment) in one or two decades is likely to increase concern about the timber supply.

The seasonal variations in timber industry employment and the longer fluctuations in employment attributable to market conditions have produced a kind of dual work force in the industry consisting of a core of stable, senior workers and a peripheral group of workers who "float" in and out of the industry in response to the higher pay (Stevens 1976). In the woods, sharp social distinction is drawn between workers in logging and those in forest management activities. Pay scales differ widely between these groups, and an unemployed logger would be very unlikely to accept a forest management job.

A recent statewide survey by Bardsley and Haslacher (Harris 1979) showed that residents of southern Oregon were more concerned about increased timber production on public lands and more likely to oppose wilderness formation than people in the State as a whole. They were less favorably disposed toward more wildlife habitat or hiking and camping facilities, wanted more hunting and fishing on public lands, and were less opposed to the use of off-road recreational vehicles and snowmobiles than others in Oregon. These survey results are shown in Table 2-22.

Table 2-22 Changes Desired by Survey Respondents in the Use of Federal Lands (Percent distribution omitting undecided respondents)

	Oregon			Southern Oregon		
Use	More	No Change	Less	More	No Change	Less
Wildlife habitat	61	30	8	49	36	14
Hiking/Camping	52	38	8	40	46	12
Wilderness	44	38	16	32	28	39
ORVs/snowmobiles	13	24	60	19	33	44
Timber production	41	38	19	60	26	13
Hunting/Fishing	51	40	7	53	42	4

Source: Tiff Harris, Public Perceptions of Federal Land Use Decision-making in Oregon: Results of a State-wide Survey, Oregon State University, August 1979.

Fears of herbicide use arising from health concerns are intensely held by a small part of the community.

CHAPTER 3
ENVIRONMENTAL CONSEQUENCES

CHAPTER 3 ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

Throughout this Chapter, environmental consequences (impacts) are compared to the existing situation as described in Chapter 2. The significant impacts resulting from implementation of the proposed action and each of the alternatives are analyzed in relation to that baseline. A tabular comparison summarizing the major impacts from the proposed action and each alternative is shown in Table 1-5. Analysis, including the scoping process, indicates that there would be no significant impacts upon climate, geology, topography, minerals, grazing, agriculture, utilities and communication sites, and these topics are not discussed.

The major actions which cause impacts are timber harvest, road construction, site preparation (includes slash burning and herbicide use), animal damage control, plantation maintenance and release, precommercial thinning and fertilization. Significant effects to the local area and its economic base can also occur depending upon which alternative and harvest volume levels are selected in the decision document. These would include changes in employment, as well as sharing of sale receipts with county governments, school districts and other local taxing entities.

In analyzing the impacts of the proposed action, the sample 5-year (1982-86) timber sale plan (Appendix B) is used, where applicable, to assess site specific timber sale impacts. Possible conflicts identified in this chapter for specific sales will be thoroughly addressed in detailed site specific environmental assessments (page 1-22). Timber management treatments not included in the timber sale plan (brushfield and hardwood conversion, planting, vegetation control with herbicides, animal damage control, precommercial thinning and fertilization) are analyzed at the proposed 10-year levels. Site specific environmental assessments will be prepared when specific acreages are identified for each treatment. Analysis of the alternatives, including the proposed action, is based on the different levels of treatment shown in Table 1-2.

Because in many cases existing resource data are limited and specific sites for proposed timber management activities are not presently known for the 10-year plan period, both "most probable case" and "worst case" assessments are addressed in this Chapter.

Two time frames are used in the analysis process. The short term is the first 10 years following the adoption of a new timber management plan. The long term is defined as in excess of 10 years. Other time periods pertinent to specific impact discussions are used as necessary and are identified in the text.

A basic assumption of the analysis is that sufficient funding and personnel will be available for implemention of the final decision.

IMPACTS ON AIR QUALITY

Air quality would be significantly impacted by increased particulates produced during slash burning. To assess such impacts the following assumptions were made:

1. Burning would not be allowed during periods of high air pollution or air stagnation.

2. Burning would occur only at times approved by the Oregon State Department of Forestry which administers the Smoke Management portion of the State's Air Quality Implementation Plan.

3. Burning may occur throughout the year, but most likely would be concentrated during the spring, summer and early autumn months (May to October).

4. Smoke and associated pollutants would increase to many times the background levels in the immediate vicinity of the fire, but would reduce to near background levels at a distance of 12 to 35 miles from the fire (Fritschen et al. 1970; U.S. EPA 1978).

5. Emissions from slash burning would be uniformly distributed over the SCCSYUs.

6. About 33 percent of the total slash accumulation would actually burn (BLM, Coos Bay District).

Carbon monoxide, hydrocarbons, nitrogen oxides and other pollutants and the ratio of their weights to tons of slash burned are as given in Table 3-1.

Table 3-1 Weights of Pollutants from Slash Burning

Pollutant	(Pounds per ton of refuse)
Particulates	17
Aldehydes	0.01
Carbon monoxide	60.1
Hydrocarbons (methane)	12
Nitrogen oxides	2
Organic acids (acetic)	13

Source: Hall 1972.

After considering the amount of slash produced in forests of western Oregon, the age of most of the trees to be harvested, the type of timber to be cut and the average ratio of cut timber to slash volume, the weight of slash created by the proposed action was calculated to range from 3,222,450 to 3,866,940 tons for the first decade (Appendix G). When burned, this would produce about 9,943 tons of particulates, 35,151 tons of carbon monoxide and

about 60,891 tons of total pollutants (see Table 3-2) throughout the SCCSYUs. Slash produced and average calculated tons of pollutants under each alternative is shown in Table 3-2. The present heavy demand for wood chips may bring about a decrease in slash, but this cannot be assumed to continue for the entire decade. Such use would significantly reduce air pollutants from burning.

The amounts of additional pollutants produced from slash burning would most likely be mixed by wind and dispersed. Under the assumed management guidelines, no burning would be done on days when there was no atmospheric mixing or movement, thus the smoke would dissipate and reach background levels after traveling between 12 to 30 or 35 miles (Fritschen et al. 1970; U.S. EPA 1978).

The 1978 Annual Report on Smoke Management reported 50 burns throughout Oregon had smoke problems affecting designated areas. A designated area is a principal population center of western Oregon, established in consultation with the Oregon Department of Environmental Quality. These 50 burns constitute 1.373 percent of the 3,642 burns of 1978. Seven of the 50 burns (0.192 percent) created smoke problems at distances greater than 30 miles. None of the burns created problems at 60 miles (OSDF 1979). Prevailing winds in Oregon are from the west, therefore, smoke could be blown into the Eugene-Springfield Air Quality Maintenance Area. It is expected that burns in the northern end of the SYUs could affect the Eugene-Springfield area.

Carbon monoxide production would increase under all alternatives. Because carbon monoxide concentrations drop rapidly with distance from the point of origin (Fritschen et al. 1970), the affected area would be limited. Impacts could be significant locally, but insignificant on an areawide basis.

Although burning would be controlled to minimize impacts, the increase in particulates would be significant in the SCCSYUs under all alternatives. The degree of particulate impact is directly related to volume of harvest in each case. The effects of increased particulates near the source would be reduced visibility with subsequent impacts to esthetic values, as well as possible aggravation of chronic lung and heart diseases. Emissions of particulates from slash burning have been extensively studied, and it has been found that very small particles (0.002 to 10 micron range) remain airborne long enough to impact air quality (Himel et al. 1978). Larger particles fall out of the atmosphere rapidly, within short distances from the source. Some of the very small particulates, under certain atmospheric conditions, could become nuclei for water vapor (Hall 1972) and possibly induce precipitation. On dry days (the most likely situation) the smoke could disperse rapidly through atmospheric mixing. Although the areas most affected by increased particulates are not heavily populated, residents and recreationists have come to expect higher air quality in outlying regions than in urban areas and would be unfavorably affected.

Table 3-2 Tons of Pollutants from Slash Burning per Decade

	Acres to be Burned	Tons of Slash Minimum	Tons of Slash Maximum	Tons of Particulates	Tons of CO	Tons of Other1/	Total Tons of Air Pollutants	Percent Increase from Past Decade
Past Decade (1970-1980)	26,290	1,971,750	2,366,100	6,084	21,508	9,666	37,258	--
P.A.	42,966	3,222,450	3,866,940	9,943	35,151	15,797	60,891	39
Alt. 1 (Opt. Tbr.)	50,094	3,757,050	4,508,460	11,592	40,982	18,418	70,993	48
Alt. 2 (Tbr + Owls)	47,322	3,549,150	4,258,980	10,951	38,715	17,399	67,065	44
Alt. 3 (Opt. Other)	31,800	2,385,000	2,862,000	7,359	26,016	11,692	45,067	17
Alt. 4 (No Herb.)	40,830	3,062,250	3,674,700	9,449	33,403	15,012	57,864	36
Alt. 5 (F.P.O.)	44,283	3,321,225	3,985,470	10,248	36,228	16,282	62,758	41
Alt. 6 (MHS)	45,832	3,437,400	4,124,880	10,606	37,496	16,851	64,953	43
Alt. 7 (No ACE)	39,095	2,932,125	3,518,550	9,047	31,984	14,374	55,405	33
Alt. 8 (No Action)	35,707	2,678,025	3,213,630	8,263	29,212	13,129	50,604	26

1/ Nitrous oxides, organic acids, hydrocarbons and aldehydes found in slash smoke.

Source: Compiled from Duprey 1968, Gerstle and Kemnitz 1967; and Darley 1966 In Hall 1972

IMPACTS ON SOILS

In the undisturbed forests of southwestern Oregon, the soils are in a state of equilibrium with baseline erosion at 0.11 cubic yards per acre per year (0.1 tons/acre/year)(Ketcheson and Froehlich 1977). Road construction, yarding of downed timber, slash burning and any activity that would disturb this equilbrium would increase soil erosion. Additionally, an increase in landslides occurs on steep slopes when road building and clearcutting disturb fragile or unstable soils (Swanson and Dyrness 1975; Fredriksen 1970).

Fertilization, replanting and interplanting reduce erosion by increasing ground cover and adding more plant root zone that will hold soil in place.

Transportation System

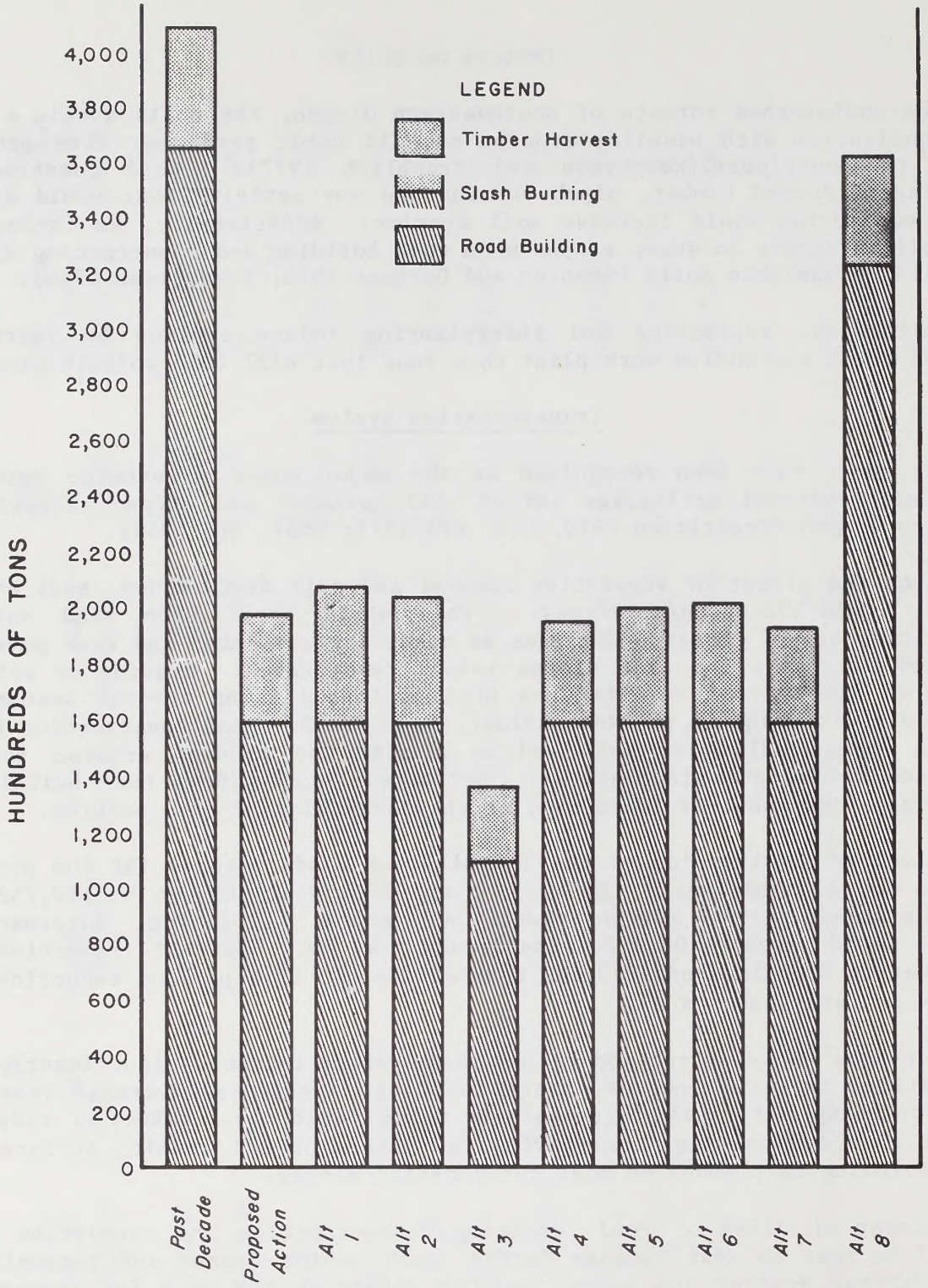
Forest roads have been recognized as the major cause of erosion resulting from silvicultural activities and of soil movement and stream siltation in western Oregon (Fredriksen 1970; U.S. EPA 1975; USDI, BLM 1959).

Based on the effect of vegetation removal and soil disturbance, soil erosion could reach 172 tons/acre/year. This would occur when road building activities begin. Erosion declines as roads are compacted and rock paved and exposed cut banks and side slopes become revegetated. Erosion of soils in the SYUs due to road building has been estimated using several assumptions which are discussed in the Methodology, Appendix D. Road construction in the sample 5-year sale plan was used as a model to predict erosion for the proposed action and alternatives. Estimated erosion from road building is shown as a component of Table 3-4, at the conclusion of this section.

Soil lost by construction of the 234 miles of roads planned for the proposed action and Alternatives 1, 2, 4, 5, 6 and 7 is estimated to be 158,752 tons for the decade, a 56.5 percent reduction from the last decade. Alternative 3 roads would erode 108,922 tons/decade, a 70.2 percent reduction and Alternative 8 would erode 322,660 tons/decade, an 11.6 percent reduction (see Figure 3-1 and Appendix D).

Erosion from the construction of new roads would increase significantly over undisturbed forest. However, there would be an expected decrease from past road building activities because new roads would be located on ridgetops rather than side slopes, rock-paving is planned on all running surfaces and hydromulching is planned on most cut-and-fill slopes.

The number of miles of road requiring reconstruction and renovation would vary from year to year because factors such as the degree and intensity of use, extreme weather and normal weather determine the need for reconstruction. Impacts of reconstruction activities are different than those of construction, and no new roads are added to the system. Based on an estimated 189 miles of reconstruction and maintenance, very little soil would erode during reconstruction.



SOIL EROSION FROM BLM TIMBER MANAGEMENT ACTIVITIES IN THE SCCSYUs BY DECADE

FIGURE 3-1

Landslide activity would increase soil loss significantly, but since most roads would not result in landslides, it is impossible to quantify losses by mass movement.

Analysis of the sample timber sale plan shows that an average of 20 percent of the planned roads are on sites mapped as fragile or special problem soils. In the worst case, should failure occur, considerable erosion would result. (See Appendix B for each sale.)

Sale units 82-30-4; 83-34-1, 83-36-1, 2, 3; 83-38-1, 2, 3; 84-42-1, 2; 85-29-2, 3; 86-29-1, 2; 86-30-1, 2, 4; 86-31-1, 4; and 86-41-6, 7, 8 have planned road construction on soil map units that contain Whobrey (501) soils. Road failures on these soils are frequent because of very poor bearing capacity, high shrink-swell, and low shear strength (Townsend et al. 1977). Sluggish mass-movement would be expected to cause long-term adverse impacts to road surfaces requiring continual maintenance. Although Whobrey soils do not fail catastrophically, under some circumstances a block could slump into a drainway, causing sediment problems. Townsend et al. (1977) indicates special design features (i.e., rock blankets and/or pilings for support of road fills, extra culverts, horizontal drains in cutbanks, perforated pipes in ditch linings) are usually required to minimize damage to these soils. If the clayey material from these soils enters a waterway, it would be expected to greatly increase turbidity and continue degradation of water quality (see Impacts to Water Resources) for an extended period.

Timber Harvest

Yarding increases erosion by destroying vegetation remaining after cutting and disturbing the protective litter surface of the soil. High-lead yarding increases erosion on clearcut sites 4.6 times that of undisturbed forests (Brown and Krygier 1971; Rice and Sherbin 1977).

With implementation of the proposed action, the annual scheduled clearcutting and cable yarding of 3,375 acres would generate 1,553 tons of erosion the first year. Accelerated erosion would decrease in about 4 years to background levels as vegetation becomes reestablished. Due to less acres being clearcut and yarded annually in SCCSYUs, there would be an 11 percent decrease from erosion caused by yarding activities of the past decade. Soil erosion from timber harvest for each alternative is shown in Table 3-4.

Compaction occurs when soils are moderately moist such as in spring or autumn. Compaction causes long-term reductions in soil porosity, and may induce rill or gully erosion. Fredricksen and Harr (1979) reported percent compaction by harvest system in western Oregon to be: tractor, 26.4 percent; highlead, 9.1 percent; skyline, 3.4 percent; and ballon, 1.7 percent.

Compaction would alter the soil productivity by limiting pore space for roots. Soils may remain compacted for more than 55 years. (Ibid). Some soils having a severe compaction hazard are the Blackley (10), Jory (12), Honeygrove (14), Apt (50), Whobrey (501) and Edson (580) series. The acres of soil which could be compacted during yarding are shown in Table 3-3.

Table 3-3 Soils Compacted by Yarding Method
(Acres per Decade)

	High Lead	Skyline	Aerial
Proposed Action	1,708	77	27
Alternative 1	2,114	95	33
Alternative 2	1,956	88	31
Alternative 3	1,183	53	19
Alternative 4	1,594	72	25
Alternative 5	1,778	80	28
Alternative 6	1,860	84	29
Alternative 7	1,501	68	24
Alternative 8	1,753	79	28

Site Preparation

Slash burning would alter the physical, chemical and microbiological properties of the soil. The magnitude of the effects would depend on the intensity of the heat generated and the duration of time the soil is exposed to the increased temperatures. A severe burn may create a water repellant zone in the surface soil; destroy the surface soil structure; volatilize considerable nitrogen; destroy nitrogen fixing bacteria, fungi and plant roots; and expose mineral soil to dry ravel and raindrop impact. A moderate or light burn would have very little adverse effect on the soil, although it would consume some organic matter and volatilize some nitrogen. Morris (1970) reported less than 0.1 percent of a slash burn site received a severe burn. Erosion would be expected to be minimal because severely burned areas tend to be small and scattered (Dyrness et al. 1957b In USDA, FS 1978) and surface cover is quickly reestablished by invading species (Mersereau and Dyrness 1972).

Erosion from alteration of the soil by fire would include, but not be limited to, an increase in dry ravel, an increase in water erosion due to an increase in runoff, and a very slight increase in wind erosion (not calculated, since it is expected to be insignificant).

On steep slopes, dry ravel may occur immediately after a fire before any rainfall, and would amount to approximately 1 ton/acre (Anderson et al. In USDA, FS 1979). Dry ravel commonly accumulates at the base of steep slopes and may not reach streams. In Douglas-fir slash burns, the danger of erosion is minimized by the very few severely burned areas which occur on steep slopes. Severly burned areas occur on benches or shallow slopes where the topography is conducive to the accumulation of slash (Mersereau and Dyrness 1972; Dyrness et al. 1957a In USDA, FS 1979). Water erosion is expected to be approximately 10 tons/acre where the soil surface is severly burned (0.1 percent of the area).

The expected erosional effects of slash burning for the proposed action and alternatives, based on studies done in southwestern Oregon (Morris 1970), are shown on Table 3-4. These effects are assumed to be a worst case situation.

Table 3-4 Soil Erosion (Tons/Decade)

	From Road Building	Percent Change	From Timber Harvest	Percent Change From Past Decade	From Slash Burning	Percent Change From Past Decade	Total Erosion	Percent Change From Past Decade
Past Decade	365,087	-	43,717	-	289	-	409,093	-
Proposed Action	158,752	-56.5	38,804	-11	473	+63	198,029	-51.6
Alternative 1 (Opt. Tbr.)	158,752	-56.5	48,039	+10	551	+91	207,342	-49.3
Alternative 2 (Tbr. + Owls)	158,752	-56.5	44,457	+ 2	521	+80	203,730	-50.2
Alternative 3 (Opt. Other)	108,922	-70.2	26,887	-38	350	+21	136,159	-66.7
Alternative 4 (No Herb.)	158,752	-56.5	36,219	-17	449	+55	195,420	-52.2
Alternative 5 (F.P.O.)	158,752	-56.5	40,398	- 8	487	+68	199,637	-51.2
Alternative 6 (MHS)	158,752	-56.5	42,274	- 3	504	+74	201,530	-50.7
Alternative 7 (No ACE)	158,752	-56.5	34,118	-22	430	+49	193,300	-52.7
Alternative 8 (No Action)	322,660	-11.6	39,835	- 9	393	+36	362,888	-11.3

Source: Compiled from data in Brown and Krygier 1971; Rice and Sherbin 1977; Fredriksen and Harr 1979; USDA,SCS Technical Notes.

Soil microorganisms destroyed by fire, specifically nitrogen-fixing bacteria, are killed at temperatures over 100° C in dry soils. Fungi are more easily killed than bacteria, and both are more adversely affected in wet soil than dry soil. Sterilization of the soil by heat would be temporary.

Increased availability of plant nutrients (phosphorus, potassium, calcium and magnesium) generally follow a burn. Nitrogen lost through volatilization would be rapidly replaced by nitrogen fixation in the forest ecosystem.

Conclusion

Erosion in SCCSYUs will decline during the next decade, regardless of the final decision within the array of alternatives. Roadbuilding (which peaked during the period 1962-1972) is the major cause of soil erosion. Except for the great amount of roadbuilding assumed for Alternative 8, Alternative 1 would cause more soil to erode than any other alternative, and Alternative 3 would cause the least. Total erosion, minus background levels, is shown in Figure 3-1 and Table 3-4.

IMPACTS ON WATER RESOURCES

Cumulative sediments produced as a result of activities of the proposed action and Alternatives 3 through 8 would be expected to decrease from present levels primarily because of reduced levels of activities. Planned activities which significantly impact water quality are road building, timber harvesting and broadcast burning of slash.

Transportation System

Following logging road construction, stream sedimentation has been found to have increased 2 to 4 times (Brown 1973) during the first few months, and as much as 250 times during a major storm causing a catastrophic mass failure (Fredricksen 1970). The amount of sediment produced by new roads depends on several factors, such as proximity to waterways, surface drainage, extent of cut-and-fill slopes, climatic events and soil erodibility. The amount of sediment yield resulting from road building in the proposed action and alternatives is displayed in Table 3-5. Comparison of these data to soil erosion levels (Table 3-4) shows that only a modest amount of erosion material would enter the stream system to affect water quality.

Analysis of the sample 5-year timber sale plan shows 10.76 miles (65 acres) or 20 percent of road construction on sites containing fragile and/or unstable soils. If soil material from these sites should enter streams, it can be expected to degrade water quality by increasing turbidity and producing long-lasting suspended sediments even in slow moving waters. (See Impacts on Soils.) On these sites, landslide activity may be expected to increase 30 times over undisturbed forests (Swanson and Dyrness 1975). If landslides block streamflow, there would be major, long-term adverse effects on water quality.

Road construction across streams increases sedimentation. Culvert installation and other instream construction at road crossings creates a short-term, localized source of sediments. Although instantaneous concentrations of sediment and turbidity are high, the energy within the small stream reaches would not be sufficient to transport sediments a great distance. The sample 5-year timber sale plan shows new road construction could cross streams at 38 places, with seven crossings on sites mapped as unstable or fragile soils. These are found in four harvest units: 82-12-2(4) tributary to Mehl Creek, 82-13-1(1) tributary to Heddin Creek, 86-30-2(1) Dement Creek and 86-31-1(1) Edson Creek. If these crossings fail, they would have a long-term, localized adverse impact on these streams.

Harvest System

Clearcut areas disturbed by yarding increase sediments 160 percent (Megehan 1972). Expected sediment yield due to yarding under the proposed action and alternatives is presented in Table 3-5.

Table 3-5 Sediment Yield (Tons/Decade)

	Yarding	Road Construction	Total	Change from Past Decade
Past decade	3,041	420	3,461	
Proposed Action	2,699	300	2,999	-13%
Alt. 1 (Opt. Tbr.)	3,342	300	3,642	+ 5%
Alt. 2 (Tbr. + Owls)	3,093	300	3,393	- 2%
Alt. 3 (Opt. Other)	1,870	200	2,070	-40%
Alt. 4 (No Herb.)	2,520	300	2,820	-19%
Alt. 5 (F.P.O.)	2,810	300	3,110	-10%
Alt. 6 (MHS)	2,941	300	3,241	- 6%
Alt. 7 (No ACE)	2,373	300	2,673	-23%
Alt. 8 (No Action)	2,771	593	3,364	- 3%

Source: Derived from data in Fredricksen 1970; Megehan 1972.

Clearcutting, by reducing evapotranspiration and increasing runoff, increases water yield by 43 percent (Harr et al. 1979). An important characteristic of forest soils of the SCCSYUs is that virtually all precipitation enters the soil; overland flow rarely occurs. Compaction would alter the infiltration capability, which may increase stream flow.

Based on the average 60 inches per year precipitation, the weighted average runoff (USDI 1977) of 29 to 35 inches per year and the expected 43 percent increase, water yields and percent changes were calculated as shown in Table 3-6.

Table 3-6 Water Yield (Acre Feet/year) from Clearcut Acreage

	Yield before Clearcut	Yield after Clearcut	Increase	Change from Past Decade
Past Decade	10,748	14,093	3,345	-
Proposed Action	9,549	12,510	2,961	-11%
Alt. 1 (Opt. Tbr.)	11,822	15,487	3,665	+10%
Alt. 2 (Tbr. + Owls)	10,940	14,332	3,392	+ 2%
Alt. 3 (Opt. Other)	6,617	8,668	2,051	-38%
Alt. 4 (No Herb.)	8,913	11,676	2,763	-17%
Alt. 5 (F.P.O.)	9,942	13,023	3,081	- 8%
Alt. 6 (MHS)	10,403	13,629	3,226	- 3%
Alt. 7 (No ACE)	8,396	10,999	2,603	-22%
Alt. 8 (No Action)	9,803	12,842	3,039	- 9%

Source: Calculated from data in Water Resources Data for Oregon, USGS Water Data Report OR-77.

Organic debris left in a stream becomes energy for microorganisms, thereby lowering dissolved oxygen. In the Oregon Coast Range, dissolved oxygen was found to be 1 part per million (ppm) in a stream adjacent to a timber harvest; nearby, in an undisturbed stream, dissolved oxygen was 10 ppm (Hall and Lantz 1969 In Brown 1973). With the proposed buffer strips and harvest restraints it is unlikely that heavy organic material will reach the stream. In the event logging debis enters the stream, BLM timber sales contracts require removal (BLM Manual 5424).

Nitrogen, phosphorus and potassium would affect the quality of water following timber harvest and slash burning. Nitrogen losses have been reported (Fredricksen 1971 In Brown 1973) to average 4.6 pounds per acre the first year after clearcutting and slash burning. Broadcast burning of 42,966 acres (proposed action) would cause a loss of approximately 98 tons of nitrogen. It cannot be expected that this total nitrogen would enter

streams, as some would be volatilized and lost in smoke. Nitrate, an oxidized form of nitrogen particularly hazardous to human infants, has been found at 0.4 ppm (a safe level) following slash burning (Brown 1973). Background levels for nitrates average 0.05 ppm (Brown 1973). Phosphorus losses following clearcutting and/or slash burning occur when organic phosphorus becomes taken up and held by sediment and is then transported in runoff to streams. Nutrient levels would be expected to increase in any stream flowing through a clearcut following site preparation (slash burning).

Other Timber Management Treatments

Based on 0.25 percent of aerially applied pellated urea (46 percent nitrogen) reaching streams (Moore 1975) and an application rate of 435 pounds urea/acre treated, nitrogen reaching streams over the 10-year planning period would range from 78 pounds in Alternative 3 to 115 pounds in Alternative 1. Moore also reported that Urea-N was gone from streams in 3 days, and all forms of nitrogen assumed to be from fertilization were gone in 6 months. Therefore, it is expected that fertilization would not have a significant impact on water quality under any alternative.

Design elements (Chapter 1) such as buffer strips and no-wind spraying are expected to prevent herbicide drift or accidental direct spraying of water bodies. Any herbicide reaching streams beyond these barriers would be insignificant and not adversely affect water quality. Movement of herbicides through the soil (leaching) is relative, and is usually measured in terms of inches or a few feet (Norris 1975). This is a slow process that would not lead to stream contamination because the herbicide would degrade before reaching free water (Ibid). For additional discussion, see Impacts on Animals and Impacts on Human Health.

General Summary

Sediments can be expected to be less than the previous decade for the proposed action and all alternatives except Alternative 1. The sample 5-year sale plan indicates 10.76 miles of roads (65 acres) would be constructed on fragile or unstable soils. Road crossings of streams on four sales may fail, causing a long-term degradation to water quality.

Water yield would increase due to clearcutting, but in all alternatives except 1 and 2 the increase would be less than in the past decade.

While all activities may increase sedimentation and turbidity in localized areas, long-term effects throughout the SCCSYUs would be less than presently occurring. Impacts to streams and rivers would be minimized by the presence of buffer strips, proper installation of culverts and other instream construction, decreased road construction and reduced levels of activities in the watersheds.

IMPACTS ON VEGETATION

This section describes the impacts on terrestrial vegetation. All impacts to aquatic vegetation are expected to be insignificant.

Terrestrial Plants

Management treatments applied under each alternative would impact the existing vegetation in direct relation to the level of treatment shown in Table 1-2. Specific acreages were not identified for some management treatments under Alternative 8, thereby precluding a discussion of the extent of associated impacts.

Transportation System

Many impacting operations are associated with road construction including the operation of tracked and wheeled vehicles, blasting, excavating, desposition of overburden and water application. Plant habitat both on and off site is severely altered. On-site soil compaction is usually so great that it would take many years for plants to recolonize, provided there were no traffic or other disturbances. Injury to off-site vegetation could occur from bruises due to machine operation or from herbicide overspray along road shoulders.

Blasting and excavation for roadways often generate spoil materials which are unsuitable for construction use or are in excess of needs. These materials are often deposited in areas away from the site, creating a potential adverse impact to off-site vegetation which may be injured or completely covered by the deposition of overburden.

Timber Harvest

Similar to those created by natural disturbances, timber harvesting initiates secondary plant succession by overstory removal, creating openings in the forest canopy. Different cutting practices (i.e., clearcutting and single tree selection methods) open the canopy to different degrees, thereby influencing the plant composition and duration of the plant communities differently.

Clearcutting completely removes the forest canopy, thereby allowing the establishment of the first successional stage (grass/forb). Thus, the vegetation composition in the SYUs would change according to the level of harvest proposed under each alternative including the proposed action. Table 3-7 shows the resulting forest profile by 10-year age class at the end of the first decade.

When compared to the existing forest profile, as depicted in Table A-1, this change is notable by a shift of acreage from one age class to another (i.e., old growth to non-stocked or 1-5 age class). This acreage shift is best shown by the percent change in managed age class stratification shown in Impacts on Animals (Table 3-9).

Table 3-7 Approximate Acres of BLM Administered Timber Lands and Percent of Change After One Decade

Habitat Age	Current Acres	Proposed Action	Alt. 1 Opt. Tbr.	Alt. 2 Tbr. and Owls	Alt. 3 Opt. Other	Alt. 4 No Herb.	Alt. 5 F.P.O.	Alt. 6 MHS	Alt. 7 No. ACE	Alt. 8 No Action
Grass/Forb Non-stocked and 0-7 years	58,700	39,000 -34%	46,500 -21%	43,700 -26%	39,200 -32%	37,000 -37%	40,300 -31%	41,800 -29%	35,600 -39%	22,300 -62%
Brush/Seedling 8-15 years	41,000	60,600 +48%	61,300 +50%	61,000 +49%	57,100 +39%	60,400 +47%	60,700 +48%	60,900 +49%	60,000 +46%	31,900 -21%
Pole/Sapling 16-45 years	48,000	68,400 +42%	68,400 +42%	68,400 +42%	61,900 +29%	68,400 +42%	68,400 +42%	68,400 +42%	68,400 +42%	74,200 +55%
Young 2nd Growth 46-115 years	57,300	54,200 - 5%	52,600 - 8%	53,200 - 7%	54,100 - 6%	54,600 - 5%	53,900 - 6%	53,600 - 6%	54,900 - 4%	73,100 +28%
Mature 116-195 years	36,800	39,200 + 7%	37,200 + 1%	38,000 + 3%	42,700 +16%	39,800 + 8%	38,800 + 5%	38,400 + 4%	40,300 +10%	15,200 -59%
Old Growth 196+ years	64,200	42,800 -33%	38,500 -40%	40,200 -37%	49,700 -23%	44,000 -31%	42,100 -34%	41,100 -36%	45,000 -30%	48,300 -25%

These columns will not have the same total acres due to the differences in the land use allocations of each alternative. This is especially true for Alternative 8 which also utilizes the 1972 land base.

Source: BLM allowable cut printout and district inventory.

Yarding practices to be employed during the proposal period consist of ground or surface cable systems (83 percent) cable with full suspension (10 percent) and aerial systems (7 percent). (See Appendix B for estimated acreages.) Each system impacts ground vegetation to different degrees relative to the soil disturbance resulting from the harvest system used. Table 3-8 shows this effect in acres. Areas of soil compaction (Table 3-3) are expected to be small and localized. Depending on severity and depth of compaction, root development could be inhibited thereby stunting plant growth. Actual losses in future vegetative growth are not quantifiable and are not expected to be significant in terms of overall vegetative production on the SYUs.

In addition, yarding operations may injure standing trees, exposing them to insect or fungal infestation which may eventually result in death. Logs being dragged and/or suspended from cables may slip or swing into standing trees causing upper stem or crown injuries. The extent of mortality or injury to trees, although impossible to estimate, is expected to be minor.

Dragging logs across the forest floor disturbs the litter exposing mineral soil, which creates a better seed bed for many species enhancing and accelerating vegetative growth.

Site Preparation

Broadcast Burning

Broadcast burning is the method of slash disposal proposed under each alternative. The short- and long-term effects of burning are relative to the severity of the burn.

According to research in the coastal strip of western Oregon, (Morris 1970), 0.1 percent of the total area burned was severely burned. While 10.5 percent of the area remained unburned, 14.2 percent and 75.2 percent received moderate and light burns respectively. The lighter the burn the greater percent the cover of herbaceous and brush species within the first 2 years after burning. The study also showed that natural restocking of coniferous species was approximately 30 percent greater on burned, as compared to unburned, sites in the first 4 years.

Some plants, including most grasses, have growing points that are close to or below the ground surface and can survive all but the hottest fire. Many shrubs have the ability to resprout from surviving stumps and roots and are stimulated by fire. The immediate effect of burning is blackened ground and the removal of most vegetation. However, after the first growing season a more vigorous growth of grasses, forbs and shrubs would occur.

The deposition of ash, changes in soil moisture relationships, nutrient and availability and soil temperatures would alter the structure of the original understory plant community. Scheduled replanting of coniferous seedlings in the area would contribute to the alteration as a fire-induced plant community became established.

Table 3-8 A Comparison of Impacts on Ground Vegetation Resulting from Yarding System (Acres/Decade)

Proposed Action and Alternatives	Surface Cable (Highlead) Bared 14.8% 2/	Cable Full Suspension (Skyline) Bared 12.1%	Aerial (Balloon or Helicopter) Bared 6.0%	Totals Bared
Proposed Action	4,145	408	142	4,695
1-Opt. Tbr.	5,131	505	175	5,811
2-Tbr. + Owls	4,749	468	162	5,379
3-Opt. Others	2,872	283	98	3,253
4-No Herb.	3,869	381	132	4,382
5-FPO	4,315	425	148	4,888
6-MHS	4,516	445	154	5,115
7-No ACE	3,644	359	125	4,128
8-No Action	4,255	419	145	4,819

1/ Bared soil is expected to be completely denuded of ground vegetation.
2/ Percentage of logged areas derived from Fredricksen and Harr 1979.

Herbicides

A temporary reduction in the natural productivity of grasses, shrubs and herbaceous species would be expected on the acreage planned for site preparation with herbicides (see Table 1-2).

The direct vegetational impacts of silvicultural herbicide treatments are short term. Grass control with herbicide is effective for 1-3 years during which time conifer seedlings become established. Grass will then partially reoccupy the site until Douglas-fir crown closure shades it out. Similarly, many species of shrubs resprout after treatment. Brush may resume dominance after site preparation spraying. Therefore, the net short-term impacts of successful site preparation spraying in the SCCSYUs would be a temporary reduction (of unquantifiable magnitude) of the natural vegetative productivity.

Poorly timed herbicide application may result in damage to conifer seedlings. Minor burning of needles by oil carriers may occur. The possibility of impacts on vegetation from accidental spills always exists.

For greater detail on herbicides and the provisions for monitoring of herbicide application, see the FEIS Vegetation Management with Herbicides: Western Oregon - 1978 through 1987 (USDI, BLM 1978).

Hardwood and Brush Field Conversion

The impacts associated with broadcast burning also apply to the acreage proposed for hardwood and brush field conversion. The natural succession of the plant community would be altered when the brush and hardwood are replaced with young conifer seedlings.

Planting

Coniferous seedlings raised in nurseries would be planted (Table 1-2). Two year old stock is normally used on initial plant acreage while 3 year old stock is normally used on replant acreage.

Planting practices are used to shorten the reestablishment time of commercial conifer species and improve distribution and numbers per acre. Planting greatly increases the competitive advantage of the conifer seedlings over the vigorous released growth of the plant species present on a logged area. Under the best possible site conditions, natural regeneration could occur in 1 year. Under artificial regeneration, seedlings are generally planted the first year following harvest. Because the planting stock is generally already 2 or more years old, it can have a competitive advantage on good sites and an even greater advantage on poorer sites. Therefore, planting shortens the amount of time required for succession to progress beyond the grass/forb and shrub/seeding stages. The major long-term impact associated with planting is that, by increasing the competitive advantage of Douglas-fir, early successional stages are more quickly passed through, and Douglas-fir attains site dominance more rapidly. This acceleration not only reduces the residence time of early successional stages but also precludes the development of maximum plant diversity.

Animal Damage Control

Proposed animal damage control measures should improve initial stocking levels and survival rate of new coniferous plantations.

Plantation Maintenance and Release

Herbicides are used to manipulate the species composition, size, density, vigor and presence of vegetation. In forestry applications, the desired effect is acceleration of plant succession from early successional stages to later stages dominated by conifers. This acceleration occurs by selective limitation of competition from plants characteristic of early stages in favor of rapid Douglas-fir establishment and growth.

Applications are targeted to control nonconiferous species to provide a competitive advantage for conifers. Different herbicides work best for different target species and herbicides are often used in combinations.

Gratkowski and Lauterback (1974) reported that the height growth of young Douglas-fir for a 5-year period after release increased in different amounts relative to the height of the trees when released and the method of release. Heights of the trees when released were between 1 and 6 feet. Percentage increase in height growth over non-released trees varied from 130 percent (for trees 1 foot high when spraying occurred) to 149 percent (for trees 6 feet high) for basal spray plots and from 155 percent (for trees 1 foot high) to 71 percent (for trees 6 feet high) for aerial spray locations.

Non-target vegetation such as agricultural crops immediately adjacent to spray units may be affected by the movement of herbicides through the air. Such impacts are limited, but not eliminated entirely, by buffer strips and by application techniques (Gratkowski 1974).

Although the direct vegetational impacts of herbicide application are short term, the effects of accelerating the establishment of conifer stands are long term. Once the coniferous stands become dominant they remain until the trees are harvested or until insects, disease or natural disasters remove them.

Precommercial Thinning

Removal of selected trees from the general level of the stand canopy concentrates light, moisture and nutrients into remaining trees thereby resulting in a greater growth rate. Understory plants, including any threatened or endangered species present could be damaged during the thinning operation.

In some cases, stands treated could be so dense that most of the cut trees would remain standing in place, supported by living trees. Therefore, the resulting impacts to the understory vegetation would be gradual, as the dead trees fell and decayed with the passage of time and growth of the remaining stand. However gradual, the change in available light, soil moisture relationships and nutrient availability could change the structure of the original understory community.

Fertilization

Timber stands would be fertilized after proposed precommercial and commercial thinning operations under all alternatives except Alternative 8. This practice would result in immediate increases of nutrient availability for all species on the site. However, associated impacts of increased vigor and growth are directed at commercial conifer species. These are short-term impacts lasting for an average of 7 years, depending on site quality.

Threatened or Endangered Plants

Threatened or endangered plant species could be susceptible to any impacts described under terrestrial vegetation. Under worst case conditions, the direct effects of injury or death to the plants could cause the immediate elimination of a species in all or a significant portion of its range. The more subtle effects of vegetative community changes could cause the eventual extinction of a species through loss of competitive ability relative to other vegetation on the site.

If any species of vascular plant is determined to be threatened or endangered by the finalized listing (to be published by the U.S. Fish and Wildlife Service), any action that contributes to its extinction or to its threatened or endangered status would be in violation of the Endangered Species Act of 1973 as amended. Therefore, the Environmental Assessment (EA), which would be prepared prior to any site specific action, would identify any threatened or endangered plant species known to be present on the site and appropriate mitigative measures to be undertaken. (See page 1-13.)

Conclusions

Alterations to plant community structure and longevity would be the most significant impacts to terrestrial vegetation on those lands included in the timber production base. These impacts are significant because they represent the long-term elimination of the majority of old-growth (196 years plus) vegetative communities from high intensity management lands in the SCCSYUs. Continued forest management would not allow natural succession to replace these communities because future forests would be harvested before they reached the 80-year age class.

Other impacts to terrestrial vegetation are less significant because vegetation which is disturbed or destroyed by timber management would eventually be replaced by other plants of the same species and natural succession would restore community structure until the next harvest stage.

Approximately 1,500 acres would be precluded from total vegetative growth due to road construction. The existing forest community structure through out the SCCSYUs would be greatly altered by harvesting an estimated 21,954 acres of 196 plus year old-growth timber. This impact is represented by a significant depletion of old-growth habitat and a like increase in early successional stage habitat. These impacts are unavoidable.

The short-term use of the commercial forest lands for timber harvest would increase the long-term production of wood fibers as old, slow-growing stands are replaced by young, fast-growing stands managed for optimum wood production. In the long term, as the area approaches a balance of age classes, there is potential for increasing the allowable harvest. Intensive timber management practices such as herbicide application would favor survival of coniferous trees and discriminate against hardwood trees, shrubs and herbaceous vegetation. Application of herbicides and fertilizers would increase wood fiber production in the long term and provide for higher rates of harvest in the short and long term.

Approximately 33,743 acres of commercial forest would be converted to early successional stage communities. Approximately 21,954 acres of old-growth Douglas-fir habitat would be irretrievably lost as long as these acres are managed intensively for timber production. Permanent road construction would eliminate vegetation from 1,500 acres.

IMPACTS ON ANIMALS

The impacts on animals or their habitats resulting from timber operations are discussed in this section. In most cases, the greatest and longest-term impacts are expected to occur on animal habitats.

The predicted structure of habitat on BLM-managed timber lands (Appendix H) and on timber production lands (Appendix I) was calculated using the allowable cut runs and district inventory data. In an attempt to place BLM plans in perspective, the predicted structure of habitat in the entire South Coast area (as defined in Chapter 2 Animals) was also estimated by applying extremely rough projections of harvest levels (by ownership) on all these lands over the first 10 decades. (See Appendix H)

Anticipated impacts on selected species are shown in Table 3-9. Each action is divided into short and long-term effects. Short term is considered to be up to 10 years and long term anything in excess of that. It is recognized that the immediate effects may be different from short term. An example of this is burning. Immediate effects are removal of all vegetation, but the short-term effects are different, e.g., good growth of grasses and shrubs and lush habitat for certain species.

Terrestrial Vertebrates

Timber Harvest

The greatest effect timber harvest would have on terrestrial vertebrates during the first decade would be the modification of habitat by clearcutting. The amounts range from 23,380 acres in Alternative 3 to 41,773 acres in Alternative 1. (See Table 1-2) The removal of mature and old-growth forests eliminates the habitat of those species of animals adapted to exist there. If similar unoccupied habitat exists nearby, then those displaced individuals could occupy them. It is unlikely that such a situation exists as it is assumed that habitats are currently at carrying capacity. Therefore, unless those displaced individuals can adapt to the new conditions, they would perish.

Currently, there are about 64,200 acres of old growth (196 years or older) on the timber lands of the SYUs. By the end of the decade, this would be reduced 23 percent in Alternative 3 to 40 percent in Alternative 1. After two decades, an even greater reduction would have occurred (Table 3-10 and Appendix H). By the tenth decade, old growth would have been eliminated in Alternative 8 and reduced by 84 percent in Alternative 3. When habitat structure on the entire South Coast area is projected, only an estimated 4 percent would remain in old growth by the year 2030. This is because most old growth on private timber lands would have been harvested. At that time,

Table 3-9 Impacts of Treatment Action on Selected Terrestrial Vertebrates

	Clearcut		Single Tree Selection		Yarding		Transportation		Burning		Chemical Vegetation Control		Planting		Precommercial Thinning		Fertilization	
	S	L	S	L	S	L	S	L	S	L	S	L	S	L	S	L	S	L
1. Goshawk	-3	-3	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0
2. Bald eagle	0	0	0	0	-1	0	-1	0	0	0	0	0	0	0	0	0	0	0
3. Osprey	0	0	0	0	-1	0	-1	0	0	0	0	0	0	0	0	0	0	0
4. Blue grouse	+1	0	0	0	+1	0	+1	+1	+1	0	0	0	+1	0	0	0	0	0
5. Ruffed grouse	+2	0	0	0	+1	0	+1	+1	+1	0	-1	0	0	0	0	0	0	0
6. Mountain quail	+2	0	0	0	+1	0	+1	+1	+1	0	-1	0	0	0	0	0	0	0
7. Band-tailed pigeon	-2	-2	0	0	+1	0	0	0	+1	0	-1	0	0	0	0	0	0	0
8. Spotted owl	-3	-3	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9. Saw-whet owl	-3	-3	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10. Pygmy owl	-3	-3	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11. Vaux's swift	-3	-3	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12. Anna's hummingbird	+3	0	0	0	+1	0	0	0	+1	0	-1	0	-1	0	0	0	0	0
13. Pileated woodpecker	-3	-3	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14. Hammond's flycatcher	-3	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15. Tree swallow	-1	-1	-2	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16. Brown creeper	-2	-2	-2	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17. Bewicks wren	+3	0	0	0	+2	0	0	0	+2	0	-2	-2	-1	-1	0	0	0	0
18. Hermit thrush	-3	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19. Orange-crowned warbler	+3	0	0	0	+2	0	0	0	+1	0	-1	0	-1	0	0	0	0	0
20. Townsend's warbler	-3	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21. Hermit warbler	-3	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22. Common yellowthroat	+3	0	0	0	+2	0	0	0	+1	0	-1	0	-1	0	0	0	0	0
23. Red crossbill	-3	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24. Savannah sparrow	+3	0	0	0	+2	0	0	0	+1	0	-1	0	-1	0	0	0	0	0
25. Vesper sparrow	+3	0	0	0	+2	0	0	0	+1	0	-1	0	-1	0	0	0	0	0
26. Yuma myotis	-3	-3	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27. Long-eared myotis	-3	-3	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
89. Silver-haired bat	-3	-3	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29. Brush rabbit	+3	0	0	0	+2	0	0	0	+1	0	-1	0	-1	0	0	0	0	0
30. Mountain beaver	+3	0	0	0	+2	0	0	0	+1	0	-1	0	+1	0	0	0	0	0
31. Northern flying squirrel	-3	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32. Western red-backed vole	-3	-3	0	0	0	0	0	0	0	0	0	0	0	+1	0	+1	0	0
33. Red tree vole	-3	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
34. Black bear	+1	0	0	0	0	0	-2	-2	+1	0	0	0	0	0	0	0	0	0
35. Marten	-2	-2	-2	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36. Fisher	-3	-3	-2	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
37. River otter	0	0	0	0	-1	0	-1	-1	0	0	0	0	+1	0	0	0	0	0
38. Mountain lion	+1	0	0	0	0	0	-2	-2	0	0	0	0	0	0	0	0	0	0
39. Bobcat	+2	0	0	0	0	0	0	0	+1	0	0	0	0	0	0	0	0	0
40. Roosevelt elk	+2	0	0	0	+2	0	-2	-2	+1	0	-1	0	-1	0	-1	-1	+1	0
41. Black-tailed deer	+2	0	0	0	+2	0	-1	-1	+1	0	-1	0	-1	0	-1	-1	+1	0

Key

0 No identifiable impact
- Negative impact
+ Positive impact
1 Minor
2 Moderate
3 Significant
S Short-term
L Long-term

virtually all old-growth timber remaining would be on Federal lands (administered by BLM and U.S. Forest Service). Along with this reduction of old-growth habitat, a corresponding reduction of old-growth-dwelling populations, such as Vaux's swift, hermit warbler and red tree vole is possible.

Table 3-10 Acres of Old Growth (196+) on Timber Lands Remaining at End of Each Decade for Proposed Action and all Alternatives

Year	Proposed Action	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	Alt. 8
1991	42,788	39,496	40,206	49,677	44,010	42,039	41,158	45,008	48,349
2001	22,108	9,682	14,369	36,839	22,503	22,108	22,108	24,058	17,209
2011	21,320	10,272	14,753	34,254	21,320	21,320	21,320	21,320	10,956
2021	21,735	10,862	15,357	33,985	21,735	21,735	21,735	21,735	-
2031	22,504	11,452	16,061	34,222	22,405	22,405	22,405	22,405	-
2041	22,618	12,043	16,560	33,755	22,618	22,618	22,618	22,618	-
2051	23,977	12,634	17,486	35,820	23,977	23,977	23,977	23,977	-
2061	27,070	13,225	19,142	40,871	27,070	27,070	27,070	27,070	-
2071	30,297	14,440	21,211	45,862	30,297	30,297	30,297	30,297	-
2081	31,783	15,655	22,552	47,907	31,783	31,783	31,783	31,783	-

Source: BLM allowable cut printout and district inventory.

The vegetative successional stages that follow harvest would benefit some species. The savannah sparrow, brush rabbit, mountain beaver and mountain quail are examples of species that use early successional stages. The usefullness of this stage to wildlife would be limited as these lands would be planted with coniferous seedlings and, in some cases, other vegetation would be reduced. The resulting forest is not a natural successional stage, but a very simplified one. Currently, there are about 97,700 acres of non-stocked and early (less than 15 years old) stage vegetation on the timber lands of the SYUs. The changes in this habitat that would occur after the first decade are shown in Table 3-7. In future decades, this habitat would be greatly reduced (See Appendix H). A like reduction in wildlife populations using this habitat is possible.

Food supplies for grazers and browsers are more readily available in the early successional stages as compared with other successional stages. Deer and elk use would increase and peak 6 to 8 years following clearcutting (Harper 1969; Crouch 1974). However, food supply may not be utilized if sufficient cover is not nearby. In order to assure sufficient wildlife cover, Bureau policy is that clearcuts normally not exceed 40 acres in size. The MFP recommends that, when possible, clearcuts not be adjacent to another clearcut less than 10 years old. (See Table A-3, Issue III) However, due to regeneration lag, the vegetation on previous clearcuts may be only 6 years old, and this age provides only minimum cover. In the proposed action and Alternatives 4, 5, 6 and 7, approximately 36,500 acres (see Table 1-3) have been selected for special management because of wildlife values. Special management includes 350-year average minimum harvest age and careful placement of cutting areas. (See Table A-3). Alternative 1 contains no special wildlife management areas, Alternatives 2 and 8 contain less than the proposed action, while Alternative 3 contains considerably more (see Table 1-3).

Of the 36,500 acres discussed above, about 32,500 acres are located in a corridor to provide blocks of mid-age and old-growth habitat throughout the district (see Figure 1-3). The additional 4,000 acres were identified to broaden the corridors and function as key big game cover.

Based on the sample 5-year timber sale plan, 56 sale units would exceed 40 acres in size and 103 would not meet the 10-year spatial criterion. (See Appendix B) Eight of the latter sales, because of their placement, have potential conflict and impacts with the overall proposed management plan (see Appendix A, Table A-3, Issue II). Elimination of old-growth in these eight sale units would create habitat gaps, or degrade the quality of the habitat in the corridor, thereby violating its integrity. These potential conflicts occurring in sale units 82-33-1, 82-33-2, 82-41-1, 84-25-1, 84-26-1, 85-26-1, 85-43-2 and 86-27-4, would be addressed during site specific planning (see Introduction).

About 10,400 acres of key big game cover have been identified in the SYUs. This includes both thermal and survival cover and elk calving areas. Approximately 5,150 acres would receive special management as part of the 36,500 acres described above. The remaining 5,250 acres of key big game cover would not receive special consideration and about 750 acres are included in the 5-year plan. Projecting this amount indicates harvest of the unprotected key areas in 31 years. The removal of 50 percent of the existing key big game cover areas during the next three decades would have a significant adverse impact on the big game populations of the SYUs.

Snag-dependent wildlife such as woodpeckers and other cavity dwellers would be adversely affected due to snag removal during harvest operations. A proposed MFP decision applicable to all alternatives is to retain enough snags to manage for a 60 percent population level of primary excavators. Therefore, a possible reduction of cavity dwellers by 40 percent is likely under any alternative. This would be significant and adverse. Because of State of Oregon safety regulations, it is possible that more snags would be eliminated, further reducing populations.

New snags are created by natural mortality in the forest. The proposed action and all alternatives would receive some amount of mortality salvage during the decade (see Table 1-2). The number of trees per acre, their age and size are variable and not predictable. While in general the impacts would not be immediately significant, these trees are the snags and down forage logs of the near future and removing them eliminates potential and needed habitats.

Thomas (1979), Meslow (1977) and Wright (1974) have shown that certain species of vertebrates are associated with forests that are of a particular age class and resulting structure. Some species habitat requirements are rigid, others are more flexible.

Currently the forest of the SYUs has a fairly even distribution of successional stages, thereby providing good habitat diversity. (Table 2-4 and Appendix H) As a result of the proposed action and all alternatives, the forest would become greatly altered after two decades and even more distorted after 10 decades were the action to continue. This reduction of habitat diversity would be significant and extremely adverse. (See Appendix H). Corresponding changes in species of animals would occur as the age and structure of the forest changes. In comparison, the current successional stage distribution of the entire South coast area lands are skewed to the younger types (See Table 2-4).

In future decades, clearcutting acreage would decrease while commercial thinning dramatically increases (Figure 3-2 is an example based on the proposed action). Commercial thinning would occur in the pole/sapling and young second growth that account for the majority of habitat remaining at the end of 10 decades.

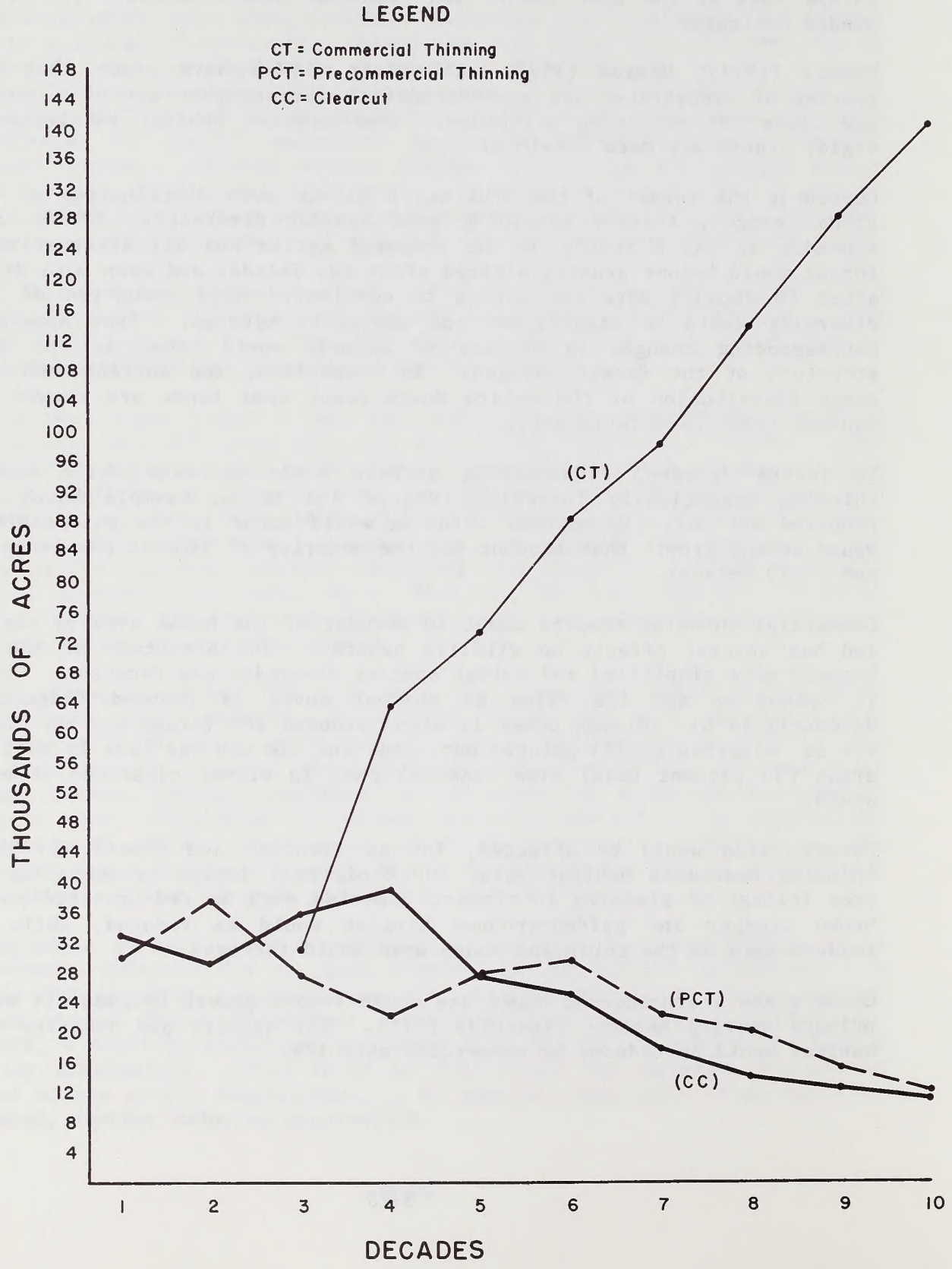
Commercial thinning removes about 40 percent of the basal area of the forest and has several effects on wildlife habitat. The structure of the forest becomes more simplified and animal species diversity may decrease. The stand is opened up and its value as thermal cover is reduced (Edgerton and McConnell 1976). Hiding cover is also reduced and forage may not increase, for as Edgerton (1972) pointed out, deer and elk use was less in partial cut areas (30 percent basal area removed) than in either clearcuts or unlogged stands.

Forest birds would be affected, for as Franzreb and Ohmart (1978) show, thinning decreases habitat value for birds that forage by searching in the tree foliage or gleaning in timber. Species such as red-breasted nuthatch, brown creeper and golden-crowned kinglet would be reduced, while ground feeders such as the robin and house wren would increase.

Coopers and sharp-shinned hawks use dense second-growth Douglas-fir as their primary nesting habitat (Reynolds 1971). The quality and quantity of this habitat would be reduced by commercial thinning.

FIGURE 3-2

FOREST TREATMENTS BY ACTION BY DECADE: PROPOSED ACTION



Yarding

The skidding of logs during yarding destroys low vegetation and compacts the soil. The complete but temporary destruction of surface vegetation due to yarding (see Table 3-8), would reduce the amount of habitat for small rodents and insectivores. Shallow soil disturbances that do not remove excessive topsoil may benefit local wildlife populations such as elk and deer, seed-eating birds and certain rodents that depend on early successional communities. Swanson (1970 Cited in Bunnell and Eastman 1976) reported significantly higher elk use on moderately or heavily disturbed sites than on lightly disturbed sites.

Transportation System

Road construction would eliminate vegetation from the ground surface. The acreage would vary depending on the alternative selected. The impacts of habitat elimination would be adverse and perpetual since most road systems would be maintained indefinitely. Increased mortality due to hunting and collisions with vehicles is unpredictable but probably insignificant.

Harassment of wildlife by vehicles undoubtedly would occur and during stress situations, such as times of temperature extremes, may have an adverse impact. Also, habitats within one-half mile of roads are avoided by elk (Lyon 1979). Additionally, increased traffic could have an adverse impact to large carnivores such as black bear and cougar. The proposal and all alternatives contain recommendations to close some existing roads in order to reduce harassment and poaching.

Other Forest Management Treatments

Other treatments (Table 1-2) alter animal habitat through vegetative manipulation. Planting and fertilization were judged to have no significant impacts and are not discussed.

Slash burning would eliminate some live vegetation and combustible material including existing and potential forage logs and snags from the treated areas. Immediate impacts would be removal of vegetation and associated animal populations from those acres burned. This would last less than one growing season, after which a vigorous growth of grasses and forbs would appear and animal populations adapted to early stage vegetation would be reestablished. Table 1-2 lists acres to be burned for the proposed action and each alternative.

Harper (1969) reported higher Roosevelt elk use on logging sites that had been burned than on those that had not been burned, and explains that on burned sites grasses were more than three times as abundant. Grasses are a preferred food item of elk. He warned, however, that slash burning would not necessarily increase forage and subsequent elk use on all sites as physical characteristics make each site different in its response to burning.

Crouch (1974) indicated that slash burning increased the food supply for black-tailed deer and also removed obstacles to deer movement.

The proposed action and all alternatives except Alternative 4 call for herbicide use in site preparation and conifer release during the decade. The impacts from the proposed action and all alternatives except Alternative 4 are the same, only the magnitude changes. (See Table 1-2 for acres treated.)

There are four major types of impacts to animals that could be associated with silvicultural herbicide application: exposure to toxic chemical levels, exposure to chronic levels, habitat modification and carrier impacts. The following is a brief description of these four impacts. For much greater detail, refer to the final EIS on herbicides (USDI, BLM 1978).

Exposure to acute toxicity levels of herbicides is not anticipated as none of those proposed for use have been reported to be highly toxic to wildlife when used as manufacturer's label prescribes. In some laboratory tests, however, rats fed with high doses of 2,4-D mixed in their food showed a tendency toward tumors, but the researchers did not conclude that 2,4-D was carcinogenic (Hansen et al. 1971). In another part of the same study, dealing with reproduction in rats, the authors state "While a level of dietary 2,4-D as high as 1,500 ppm appears to have had no deleterious effects on fertility of the male or female rats or on average litter size, it did sharply reduce the percent of pups born that survived to 21 days of age and depressed the weights of these weanlings."

Gyrd-Hansen and Dalgaard-Mikkelsen (1974), and Somers et al. (1974a and 1974b) report that Lutz-Ostertag and Lutz (1970) found that pheasant and partridge eggs sprayed with 2,4-D had high mortality and a large number of malformations among the embryos. However, these same authors were unable to duplicate these results. Gyrd-Hansen and Dalgaard-Mikkelsen (1974) did report embryo-toxic and teratogenic properities after high levels of 2,4-D had been injected directly into the yokes of hens' eggs. Also, Dost (1978), in reviewing the literature, reported the fetotoxic and teratogenic effects of 2,4-D in the laboratory. None of these results have been substantiated in the field.

Chronic (long-term) effects of herbicides on animals are generally unknown in those herbicides proposed for use. It seems unlikely that an individual animal would be exposed to repeated treatments.

Herbicides have pronounced impacts on wildlife habitat. These impacts are brought about by losses of habitat diversity and stratification resulting from the temporary elimination of certain plants that are in competition with the desired coniferous species. This would adversely impact those animals that utilize the grass/forb and shrub/seeding successional stages.

Diesel oil is often used as a carrier for forest herbicides. Data on the toxicity of diesel oil on wildlife are limited; however, some work has been done on the adverse effects on adult ducks (Tucker and Crabtree 1970; Hartung 1966; Hartung 1965). It is unlikely that wild animals would consume lethal amounts of the carrier because of the dilution factors involved. It may, however, adversely affect the palatability of the forage.

Other potential impacts include the coating of eggs, thereby affecting their hatchability; and the soaking of individuals, making them more susceptible to other environmental stresses. However, data are insufficient to accurately predict the impacts of diesel oil carrier on animals in the planning area.

Animal damage control measures would be applied to varying amounts of acreage depending on the Alternative selected. Table 1-2 lists those options. An unknown percentage of this acreage may be subjected to trapping in an attempt to control numbers of mountain beaver, which are expected to increase because of the new habitat created by clearcutting. Past records indicate an average of about two per acre are removed. Non-target species such as long-tailed weasels, skunks, mink, rabbits, squirrels and woodrats make up 13 percent of the catch. This seems high, at least by U.S. Forest Service standards where 3 to 6 percent of the total catch is expected to be non-target species (USDA, FS n.d.). To mitigate this, BLM will move the trigger set to the side allowing the passage of the smaller species.

Brush field and hardwood stands (mostly alder) would be removed in an attempt to convert the land to productive conifer sites. These areas would be similar to clearcuts, but would be unregulated by the MFP recommendations on time and size restraints. The acreages so treated are listed in Table 1-2.

The modification of these acres would adversely affect the animals existing there. Although many animal species use them, few if any are restricted to this habitat type. In the Coast Range, the vegetative understory in alder stands is an important source of food for elk and removal of these stands could have an adverse impact on elk (Harper 1980, Personal communication).

Hardwood stands do provide hiding and summer thermal cover for deer and elk. Elimination of these stands would decrease this essential habitat.

Precommercial thinning, although it may open a young forest canopy, generally does not benefit deer and elk because the unremoved slash impede movements. Therefore, the obstacle presented by slash accumulations prevents deer and elk from utilizing any forage increases which result from the thinnings. Cover use is also prevented by slash accumulations. Assuming that precommercial thinning would, in a worst case situation, prevent deer and elk utilization, this practice would result in the removal of from 10,761 acres to 33,886 acres of potential deer and elk hiding cover, depending on the alternative selected. (See Table 1-2.) This condition could last as long as one decade before decomposition removed the obstacles. The amount of acreage receiving precommercial thinning would decline over time (see Figure 3-3 for an example).

Conversely, birds and small mammals may increase their use of an area following precommercial thinning. Slash accumulations provide cover for them and any increases in forage production can be utilized.

Fish

The impacts of the proposed action on fish and their habitat fall into the broad categories of increased accumulation of bottom sediments, increased amounts of suspended sediments, altered amounts of stream flow, introduction of logging debris and change of water temperature.

Fish habitat is a function of the water quality and physical structure of the stream. Improving or maintaining high quality water will benefit fish, particularly salmonids. Preferred fish habitat provides a diversity of structure; pool areas and fast water; and cover in the form of logs, boulders and vegetation. The gravel and rock substrate produce macro-invertebrates which provide an important food supply. The gravels are also required by salmonids for spawninig.

All fish are most susceptible to environmental degradation during the reproductive period and early weeks of life. Siltation can cover spawning gravels and spawning areas, making them unusable or coating eggs and fry, killing them. Turbid waters reduce the production of food organisms and hinder the feeding process.

The impacts from the eight alternatives differ primarily in magnitude from the proposed action. These differences reflect the acres of land treated and miles of road built. For instance, Alternative 3 has fewer miles, while Alternative 8 has more miles of road than the proposed action. Alternative 4 uses no herbicides so related impacts would not occur. (See Table 1-2 for all treatments.) In addition, no site specific 5-year sale plans are available for any alternatives other than the proposed action.

In the SYUs, there are approximately 392 miles of streams that support cold water fish (see Table 2-5) on lands administered by BLM. Analysis of the 5-year sale plan shows that approximately 22 miles of stream pass through or are adjacent to 103 harvest units. (See Appendix B.) All 22 miles contain resident trout; about 13.5 miles are also used by anadromous species.

It is difficult to generalize about the impacts of the proposed action and alternatives on fish for as Moring and Lantz (1974) pointed out after a review of the literature, "Certain salmonids are more susceptible to environmental changes in streams." Coho salmon and Dolly Varden are more tolerant to physical changes in habitat while other species such as cutthroat trout are more susceptible. See Chapter 2, Fish for species occurring in the SCCSYUs.

Logging can have an adverse impact on fish habitat by causing siltation of pool and gravel areas, loss of streamside cover and bank stability, loss of shade with resultant increased water temperatures. Direct changes in fish populations cannot always be tied directly to habitat modification because of the cyclic nature of anadromous salmonid populations. Burns (1971) pointed out in his study of carrying capacity for juvenile salmonids in Northern California, "Even with 3 years of prelogging study, it would be difficult to attribute a change in carrying capacity under 50 percent to anything but natural variation."

The habitat of aquatic invertebrates, which are important both as food for fish and as indicators of stream quality, can also be modified or destroyed by the same factors that affect fish habitat. It is assumed that impacts to most invertebrates would be similar to those experienced by fish in localized areas. It is not possible to quantify these impacts.

The maintenance of buffers as outlined in Table A-3 should help minimize stream degradation. Research by Erman et al. (1977) revealed that when buffer strips of at least 30 meters (about 98 feet) width on each side were maintained, the macro-invertebrate populations were indistinguishable from those of unlogged streams.

Chapter 3, Impacts on Water Resources, provides data on expected amounts of sediments and water that would reach the streams of the SCCSYUs and compares them to existing amounts. Many of the analyses and conclusions appearing in this section are based on those data.

Timber Harvest

The cutting of a forest affects water yield regardless of the method used. Cutting may be responsible for debris entering a stream and can also influence water temperature if streamside vegetation is removed. Cutting does not, however, influence sediment yield, therefore cutting per se would have only a limited impact on the streams of the SCCSYUs.

Where some streamside vegetation is retained, no change in temperature was observed (Brown and Krygier 1970). If buffer strips are maintained as proposed, no impacts on water temperatures are expected.

Clearcutting increases water yield (see Impact on Water Resources), which could have a scouring effect on stream bottoms, thereby removing gravel and aquatic vegetation. Water yield increases could have a local minor adverse impact but a negligible one to the SYUs as a whole, since overall water yields are expected to decrease except in Alternatives 1 and 2 where small insignificant increases are possible. Where buffer strips are maintained it is unlikely that significant amounts of debris would enter the rivers.

Yarding

Yarding could contribute considerable sediment to local streams. Increases in bottom sediments according to Gibbons and Salo (1973) cause the most damage of all factors affecting aquatic life. The amount of sedimentation would depend on the alternative selected: most would result in decreases compared to past activities but one would increase sedimentation (see Table 3-5). The increase is small (5 percent), but there could be adverse impacts in local situations. In the 5-year plan, there are 26 harvest units on unstable soils that are adjacent to streams with cold water fish values. These are listed in Appendix B. Should project design features fail, portions of these streams could be adversely impacted.

Transportation System

The construction of roads can add greatly to the sediment load of a river. Maintenance problems with existing roads would continue to contribute to this problem. However, impacts from maintenance cannot be quantified.

Road building during the decade would be less than in the past decade (except in Alternative 8), accordingly, sedimentation from road building would be reduced. (See Table 3-5) Analysis of the 5-year sale plan shows 6.37 miles of road from 20 harvest units would be built on fragile or unstable soils that are adjacent to streams with fishery values. If sedimentation increased, the impacts would be adversely significant to localized areas.

Eight new roads would cross streams with fishery values. Three are on stable soils so only short-term localized impacts are expected. However, five are on special problem soils (82-12-2(4) and 86-30-2(1)). Should these crossings fail because of soil type there would be long-term adverse impacts. Of the five, unit 86-30-2 is potentially the most harmful (see Impacts on Soils). Should the associated road crossing of Dement Creek fail, the downstream salmon and steelhead spawning areas could be significantly impacted.

In discussing impacts to the aquatic invertebrates, Erman et al. (1977), suggest that repeated failure of road crossings was the cause of disruption of the stream biota, not the construction of road crossings. Investigations in the vicinity of newly installed culverts showed only a slight impact.

Other Forest Management Treatments

Burning, animal damage control, precommercial thinning and fertilization are not expected to have a significant impact on fish.

The chemicals proposed for use for vegetation control and the levels of their application are not expected to measurably affect aquatic vegetation. Streamside vegetation that provides shade could be altered in a worst case circumstance. Buffer strips along streams should prevent this from occurring. However, due to pilot error, some parts of these buffer strips may receive application, and some detectable amounts may reach the stream.

Toxic effects of herbicides on fish have been documented in the laboratory U.S. EPA (1977). However, proposed field application rates would be considerably less than the minimum lethal dose for those species tested, and toxic affects are not expected. (See final EIS on herbicides, USDI, BLM 1978b, for more detailed information.) However, Cameron and Anderson (1977) felt that in order to evaluate the impacts to aquatic plants and animals under field conditions, more study was needed.

Planting of commercial tree species would accelerate succession and, therefore, retard runoff and provide shade more quickly than natural succession. This process may benefit fish, however, it is not possible to quantify this benefit.

Hardwood stand and brush conversion would have the same impacts that clearcutting and its associated yarding would have. Much less acreage is involved and the impacts would be considerably less than for clearcutting. Some local adverse impacts would occur if the conversion takes place near streams.

Threatened and Endangered Animals

Threatened and endangered species receive special attention under the terms of the Endangered Species Act of 1973 as amended and BLM policies and guidelines. Known locations of these species are avoided and special precautions taken to assure their well being. (Chapter 1 Forest Management Treatments and Design Elements)

The expected impacts to those species recognized as threatened or endangered are discussed in this section. Because of their habitat requirements and locations, no impacts are expected to occur to the California brown pelican, Aleutian Canada goose, peregrine falcon or western snowy plover.

Timber Harvest

Habitat modifications caused by clearcutting would have major impacts on old-growth-dwelling species. The northern spotted owl is dependent on old-growth, closed-canopy forests and would be greatly affected. Currently there are 25 pairs known to occur on BLM-administered lands of the SCCSYUs. Pursuant to the Oregon Endangered Species Task Force recommendations, BLM has agreed to protect a minimum of 16 pairs of owls in the SYUs. The proposed action and Alternatives 2, 4, 5, 6 and 7 are designed to meet this goal, Alternative 3 would protect all 25 pairs while Alternative 1 and 8 make no provision to protect any owls. For each pair of owls, the Endangered Species Task Force management plan calls for total protection of 300 acres of old-growth core area (if available) and an additional 900 acres to be managed to provide at least 50 percent of the acreage in stands of 30+ year-old forests. The 16 pairs proposed for protection may change occasionally as new pairs are located or new timber replacement stands become available. The habitat of the 16 pairs of owls provided the major segments for the proposed ecosystem corridors referred to in Chapter 1. These corridors will provide more optimum habitat than the guidelines recommended. The periphery of the habitat of one of these 16 protected pairs is included within cutting unit 86-24-2. If the proposed action is adopted, this sale would have to be reviewed to eliminate any conflict.

Northern spotted owls other than the 16 pairs would have their habitat reduced or eliminated if within a sale area. If it is assumed that all spotted owl habitat is at carrying capacity, then it is likely that these owls would be eliminated. The habitat of five pairs of owls not included in the 16 pairs proposed for protection would be jeopardized by 23 cutting units in the 5-year plan. Appendix B lists sale unit conflicts.

None of the nine active bald eagle nest sites occur on lands administered by BLM, although one inactive and two active nests are within one-quarter mile, and one inactive nest is on BLM-administered lands. Bald eagles are not expected to be impacted since U.S. Fish and Wildlife Service Bald Eagle Management Guidelines (1977) are followed to avoid adverse impacts.

Yarding

Yarding practices would have negligible effects on any threatened or endangered species.

Transportation System

Threatened or endangered species would probably be affected only to the extent that access by vehicle would be possible to previously unaccessable areas. This impact cannot be quantified or qualified.

Other Forest Management Treatments

No impacts are anticipated from developmental treatments. By the time these occur, the forest has been cut and major habitat modifications have already taken place.

Conclusions

The drastic changes in habitat that would occur as the forest shifts from a fairly even distribution of successional stages to a forest where two successional stages predominate and habitat diversity is low (See Appendices H and I) would cause the most significant adverse impacts to wildlife in the long term. This occurs on both BLM-managed lands and the entire South Coast area. These impacts are extremely adverse.

During the first decade, a reduction in old growth would occur. This could be a 23 to 40 percent reduction depending on the alternative. By the end of the second decade, amounts ranging from 43 to 85 percent of the current old growth would be gone. In the entire South Coast area, the existing old growth is expected to decline by an estimated 50 percent and 66 percent after the first and second decades, respectively, if the proposed action were adopted. These percentages would not vary significantly regardless of the alternative selected. A corresponding reduction in populations of those species that find their optimum habitat in old growth, such as Vaux's swift, hermit warbler and red tree vole, is probable. This reduction would be adverse and significant. Table 3-10 lists old growth remaining on timber lands, after each decade, for the proposed action and all alternatives.

By the end of the second decade, a 19 to 42 percent reduction in early successional stage vegetation would have occurred, while in the entire South Coast area, a 29 percent reduction would have taken place. A decrease is possible in populations of species such as savannah sparrows, brush rabbits and mountain quail, that depend on these habitats. This would be adverse and significant.

Approximately 50 percent of the identified big game survival cover would be eliminated after three decades if the proposed action were adopted and continued. In a worst case situation, this could result in a 50 percent reduction in deer and elk in the event of an extremely harsh winter. Populations may recover, until such time as another harsh winter occurs. This elimination would be adverse and significant.

Cavity dwellers would be reduced by 40 percent and mortality salvage of dead and dying trees would prevent many needed snags from developing. This impact is long term, irreversible and significant if the action is carried out indefinitely.

Commercial thinning would increase dramatically after four decades and would occur in those successional stages that account for most of the habitat. Thinning decreases the value of this habitat for some types of animal species. If the action is continued, these impacts would be adversely significant and long term.

Habitat removed by road construction would be permanently and irretrievablely lost on those roads proposed as part of the permanent road system. The construction of new road could lead to harassment of wildlife and eliminate areas within one-half mile of these roads as useable elk and large carnivore habitat.

Herbicide use during the decade would temporarily simplify habitat on those acres so treated and reduce its value for wildlife. Because of the large acreage to be treated, the impact on habitat must be considered adverse and significant.

The possibility exists that there are some effects to birds associated with the use of 2,4-D. While this has not been shown to occur under field conditions, it must be considered as a potential adverse impact.

Cutting of hardwood stands would eliminate portions of this habitat type and as these sites are not subject to the 40 acre clearcut recommendation, large clearcuts could result. Alder stands are an important habitat for elk and their removal would have an adverse impact on these species. The elimination of hardwoods would be permanent as these acres would be planted to conifer species.

In a worst case analysis, precommercial thinning would restrict passage of large big game animals on the treated acres.

Increases in water yield could have an adverse impact on fish in small areas but a negligible one to the SYUs as a whole. Water temperatures are not expected to change.

Yarding and road building would cause sediment to increase in localized areas. In the sample 5-year plan, there are 26 harvest units on unstable soils adjacent to streams with fishery values and 6.37 miles of road to be built on fragile or unstable soils. These could have long-term adverse impacts to adjacent streams.

The proposed action would have no adverse impacts on any species listed by the Federal government as threatened or endangered. The northern spotted owl is the only species listed as threatened by the State of Oregon that would be adversely impacted. There are 25 pairs known to inhabit BLM administered lands in the SYUs; 16 are to be fully protected under most alternatives. Of the remainder, five pairs would be impacted by harvest during the 5-year plan. If action continues over the long term, the loss of all but the 16

pairs is probable unless Alternative 3 is chosen, and if Alternative 1 or 8 is selected, all may be lost. This impact is significant, adverse, long term and irreversible.

IMPACTS ON RECREATION

Most timber management activities alter recreation opportunity settings (see glossary). From these opportunity settings, recreationists participating in different activities derive different satisfactions, experiences and benefits.

When timber harvest activities take place in recreation activity areas or near recreation sites, the recreation experience could be degraded by noise, odors and even the sight of timber management activities. In some cases, a management practice could also enhance the experiences desired in certain outdoor activities. For example, viewing balloon or helicopter logging is often an enjoyable recreational sightseeing experience in itself. Table 3-11 summarizes the impacts for the proposed action and alternatives as beneficial and/or adverse, depending upon the desired experience and activity. Table 3-12 identifies those sales in the 5-year sale plan which could impact specific recreation activities and sites.

Impacts to hunting and fishing success would be dependent upon the impacts to the species sought. The section on impacts to wildlife identifies these conflicts, and Table B-1 summarizes the impacts of the sample 5-year timber sale plan to wildlife species. Those sales which conflict with fishery and/or big game values would also impact hunting and/or fishing success in those localized areas.

In general, as the recreational experience is affected, visitor use changes occur. Visitor use changes could be temporary, occurring only during actual harvest, or of many years duration if the desired recreation experience has been heavily degraded.

Under the proposed action and Alternatives 3, 4, 5, 6 and 7, commercial forest land (221 acres) would be allocated for potential recreation sites at Big Bend (Smith River) and an environmental education area near Powers. Under Alternatives 1, 2, and 8, no additional commercial forest land would be allocated for new recreation sites and thus adverse impacts to the recreation potential of these sites would occur.

Timber Management Treatments

Clearcutting would adversely impact those recreation activities related to appreciation of environmental qualities. Clearcutting would also benefically impact certain other recreational activities. In local areas, clearcutting would increase food supplies for deer and elk and use is expected to peak 6-8 years after clearcutting (see Impacts on Wildlife). This could potentially increase hunting opportunities in these localized areas. Clearcutting would also enhance dispersed recreational use, collecting and berrypicking.

Behavioral research by Langenau and Jamsen (1975), Langenau et al. (1977) and Levine and Langenau (1979) focuses specifically on the attitudes of forest recreationists toward clearcutting.

Table 3-11 Summary of Impacts to Recreation Activities 1/

Desired Experiences and Activities 2/	Timber Management Activities: Harvest Systems	Yarding	Road Construction
Appreciation of Environmental Qualities			
Hiking	-	+-	+-
Camping	-	-	+-
Picnicking	+-	-	+-
Sightseeing (specific)	+-	-	+-
Nature study	+-	-	-
Photography	+-	-	+-
Horse use	-	+	+
Climbing	-	0	+
Wilderness experience	-	-	-
Extraction of "trophies" from the environment			
Hunting	+	+	+-
Fishing	-	-	+-
Photography	+-	0	+-
Collecting	+	0	+
Activity-oriented recreation			
ORV use	+	+	+-
Water sports	-	-	-
Outdoor games	+	0	+
Snowplay	+-	+	+
Climbing	0	0	0
Activities requiring little effort			
Painting	-	-	-
Relaxing	0	0	0
Sightseeing (general)	+-	-	+-
Social activities involving interaction			
Nature study	+-	-	-
Social camping	+	-	+-

1/ Impacts are classified as beneficial (+), adverse (-), or none (0). Timber management treatments may enhance and/or degrade the recreational experience desired in certain outdoor activities.

2/ The analysis of impacts to recreational activities and the desired experience of participants is based upon the following research: Bassett et al. 1972; Ditton and Goodale 1972; Driver 1975; Hendee et al. 1971; Journal of Forestry 1968; Knopf 1972; Phillips 1971; Stevens 1966.

Table 3-12 Correlation Between Five-Year Timber Sale Plan and Recreation Sites, Activities and Opportunities

RECREATION SITE SETTING INTEGRITY [1]	Possible Impacting Timber Sales (5-Year Sale Plan)	Potential Impact to Localized Visitor Use [2]
BLM		- L
Burnt Mountain	83-25	
Smith River Falls	82-6, 83-2, 86-3	
Fawn Creek	82-6	
Vincent Creek	83-2, 85-1	
County		- L
Bennett County Park	82-25	
Judge Hamilton County Park	85-27	
LaVerne County Park	85-22	
RECREATION ACTIVITIES & QUALITY RATING [3]		
Fishing		- L
Rasler Creek (B)	82-36, 84-28, 86-40	
Middle Fork Smith River (B)	83-6	
West Fork Smith River (B)	82-7, 82-10, 82-11, 83-10, 84-9, 85-7, 85-8, 86-8	
Smith River (A)	82-6, 82-10, 84-3, 86-6	
Vincent Creek (B)	85-1, 85-3	
Wassen Creek (B)	82-1, 85-3	
Little Paradise Creek (B)	84-4	
Mill Creek above Tidewater (B)	83-12	
Big Creek (B)	83-43, 85-30, 86-38	
North Fork Coquille River (A)	82-25	
Cherry Creek (B)	86-24	
Tioga Creek (B)	84-20, 84-22	
Hunting (Big Game)		+ L
Rowland-Baker (B)	83-31, 83-36, 85-37, 86-41	
North Highway 42 Valley (B)	83-33, 83-34, 83-44, 83-45	
Oxbow Burn (A)	82-3, 84-2, 85-4, 86-6	
Highway 38 Valley (B)	86-14	
Camp Creek Drainage (A)	82-14, 82-15, 83-13, 83-14, 84-11, 84-14, 86-15, 86-16	
Coos Bay Wagon Road Bench (B)	83-41, 84-36, 85-33, 83-27, 86-32	

RECREATION SITE SETTING INTEGRITY [1]	Possible Impacting Timber Sales (5-Year Sale Plan)	Potential Impact to Localized Visitor Use [2]
Bennett County Park Area (B)	82-25, 82-27, 83-27, 84-23,	
Middle Creek Falls (B)	83-24 85-25	
Burnt Mountain Cabin (A)	82-23, 82-24, 82-26, 83-23 83-25, 83-26, 83-28, 84-22, 84-24, 84-25 85-27, 85-23, 85-25, 85-26, 85-27, 86-22, 86-24, 86-26	
Park Creek (A)	83-25, 84-26, 84-27, 85-24, 86-27	
Coos River (B)	82-17, 83-22, 84-15, 84-19, 85-16, 85-19 85-22	
Coos Mountain (A)	82-18, 82-20, 82-21, 82-22, 83-16, 83-17, 83-19, 83-20, 83-21, 84-18, 84-20, 84-21, 85-18, 85-20, 86-17, 86-18, 86-20, 86-21	
Collecting (Vegetation)		+ L
T23S, R9W (B)	82-14, 86-13, 86-16	
Sandy Creek-River Creek (B)	85-31, 86-34	
Coos Bay Wagon Road (B)	83-41, 84-36, 85-33, 86-22, 86-32	
Oxbow Burn (B)	82-3, 84-2, 85-4, 86-6	
Sightseeing (Botanical)		- L
Coos Bay Wagon Road (B)	82-30, 83-41, 84-36, 85-33, 85-43, 86-22	
T26S, R9W, Sec. 9 (B)	83-16	
Moon Creek Road/North Fork Ridge Road (B)	83-21, 85-18,	
Little Camp Creek (B)	82-15	
West Fork Smith River (B)	82-11, 83-10, 84-9, 85-7, 85-8	
Oxbow Burn (A)	82-3, 84-2, 85-3, 85-4, 86-6	
Lower Brummet Creek (B)	82-26	
Blue Ridge Lookout Road (B)	83-22	

RECREATION SITE SETTING INTEGRITY [1]	Possible Impacting Timber Sales (5-Year Sale Plan)	Potential Impact to Localized Visitor Use [2]
Sightseeing (Geologic)		- L
T22S, R10W, Sec. 25 (B)	83-12	
Wassen Lake (B)	85-3	
Roman Nose Mtn. (A)	85-10, 86-12	
East Fork Coquille River (A)	83-41, 86-32	
Camp Creek (A)	82-15	
Sightseeing (Zoologic)		- L
Hwy. 42 Basin (B)	83-33, 83-34, 83-44, 83-45	
Dan Melton Road (B)	85-27	
Skeeter Camp Road (B)	82-23	
Brummet Creek Road (B)	82-26	
Shotgun Creek (B)	83-17	
Old Man's Road (B)	86-27	
T26S, R10W (B)	82-18, 82-20, 82-21, 82-22, 83-19, 83-20, 83-21, 84-18, 84-20, 85-18, 85-20, 85-24, 86-18, 86-20, 86-21	
Oxbow Burn (A)	82-3, 84-2, 85-3, 85-4, 86-6	
T23S, R9W (B)	82-14, 82-15, 84-14, 85-14, 85-15, 86-13, 86-15, 86-16	
Tioga Creek (A)	84-27	
Snowplay		+ L
Old Blue (B)	83-14	
Roman Nose (B)	82-8, 84-10, 85-10, 85-11, 86-12	
Skeeter Camp (B)	82-23	
RECREATION OPPORTUNITIES [4]		
ORV Use		+ L
BPA Powerline	84-23	
Blue Ridge	83-22, 85-19	
Hiking		- L
Tioga Creek Drainage	83-25, 84-26, 84-27	
Koos King Railroad Bed-Blue Ridge	83-22	

1/ Sales would be within 1 mile of site.
2/ Key for impact symbols: + Beneficial, - Adverse, L Low
3/ Quality ratings are as follows: A-High, B-Moderate. Impacts would be most significant in high quality recreation areas.
4/ Recreation activity potentials will be developed as a result of proposed Management Framework Plan (MFP) decisions.

Alternative 8 includes clearcutting on 34,639 acres. Under the proposed action and Alternatives 3, 4 and 7, the impacts of clearcutting would be less than under the present situation. Alternatives 1, 2, 5 and 6 would result in impacts greater than under the existing situation.

New road construction would provide additional and/or easier access for dispersed recreation. New roads would also serve to disperse recreationists thus reducing the present level of impacts upon facilities and recreational experience. In some areas, however, extending the logging road network would decrease recreational enjoyment by creating additional traffic, noise, dust, fumes and decreased visibility. Further, small tracts with roadless characteristices (e.g. Wassen Creek) would be impaired. On specific stream reaches, fishing success and water sports would be adversely affected as sedimentation and water quality changes result from timber management practices (see Impacts on Water Quality). That section concludes that the area-wide long-term effects to water resources would be less than are presently occurring.

The beneficial and adverse impacts of road construction would be most apparent under Alternative 8 and least apparent under Alternative 3. Between these extremes fall the impacts of the proposed action and Alternatives 1, 2, 4, 5, 6 and 7. While road construction would be most beneficial to dispersed recreationists, some backcountry users and anglers may experience adverse impacts.

Yarding alters the recreational experience by creating noise and odors. The impacts of herbicide use to recreationists are discussed in Impacts on Human Health. The impacts of timber management practices on general sightseeing are contingent upon those conclusions in Impacts on Air Quality and Impacts on Visual Resources. Slash burning would reduce visibility in the area of the burn and cause impacts to esthetic values. Further, the section on Impacts to Visual Resources concludes that most timber management practices create adverse impacts to visual resources by disrupting land surface and changing vegetative patterns and species composition, thereby creating contrasts.

Conclusions

The impacts of timber management operations would be both beneficial and adverse, depending on the recreational experience desired. In many cases, timber management activities would create additional areas available for the pursuit of certain recreational activities (i.e., dispersed activities, hunting, berrypicking, photography). Also, road construction may benefit certain categories of recreationists (e.g., dispersed area users) by making some areas more accessible.

In the long term, total area-wide visitor use (see Table 2-6) would not be significantly impacted under the proposed action or any alternative. Visitor use reductions would tend to balance increases in visitor use in activities which would be benefically impacted. However, visitor use increases or reductions may occur in certain areas as a result of impacts to specific recreational experiences. Table 3-13 identifies those activities which could

Table 3-13 Summary of Impacts to Recreation Visitor Use in Specific Activities 1/
Proposed Action and Alternatives

Desired Experience and Activities	Proposed Action	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	Alt. 8
Appreciation of Environmental Qualities									
Hiking	+L	-L	-L	+L	+L	-L	-L	+L	0
Camping	+L	-L	-L	+L	+L	-L	-L	+L	0
Picnicking	----	----	----	N O	A F F E C T		----	----	----
Sightseeing (specific)	+L	-L	-L	+L	+L	-L	-L	+L	-L
Nature study	+L	-L	-L	+L	+L	-L	-L	+L	-L
Photography	-L	-L	-L	+L	-L	-L	-L	-L	-L
Horse use	----	----	----	N O	A F F E C T		----	----	----
Climbing	----	----	----	N O	A F F E C T		----	----	----
Wilderness experience	+L	-L	-L	+M	+L	-L	-L	+L	-L
Extraction of "trophies" from the environment									
Hunting	-L	+L	+L	-L	-L	+L	+L	-L	+L
Fishing	+L	-L	-L	+L	+L	-L	-L	+L	0
Photography	-L	-L	-L	+L	-L	-L	-L	-L	-L
Collecting	-L	+L	+L	-L	-L	+L	+L	-L	+L
Activity-oriented recreation									
ORV use	-L	+L	+L	-L	-L	+L	+L	-L	+L
Water sports	+L	-L	-L	+M	+L	-L	-L	+L	-L
Outdoor games	-L	+L	+L	-L	-L	+L	+L	-L	+L
Snowplay	-L	+L	+L	-L	-L	+L	+L	-L	+L
Climbing	----	----	----	N O	A F F E C T		----	----	----
Activities requiring little effort									
Painting	+L	-L	-L	+L	+L	-L	-L	+L	-L
Relaxing	----	----	----	N O	A F F E C T		----	----	----
Sightseeing (general)	+L	-L	-L	+L	+L	-L	-L	+L	0
Social activities involving interaction									
Nature study	+L	-L	-L	+L	+L	-L	-L	+L	-L
Social camping	-L	+L	+L	-L	-L	+L	+L	-L	0

Key for symbols:

+	Beneficial	L	Low
-	Adverse	M	Moderate
		0	No Change

1/ Baseline for comparative analysis is projected visitor use under a continuation of the existing situation.

be slightly impacted under the proposed action and each alternative. The baseline for this analysis is projected visitor use under a continuation of the existing situation. Impacts to specific activities were determined through a comparison of treatments under each alternative to the existing situation.

The short term use of timber would result in some impacts on long term human productivity. Access would increase for some recreation users. A consequent increase in dispersed activity visitor use is expected. The managed forest would be less attractive to recreationists who seek the beauty and solitude of the old-growth forest, and visitation is expected to diminish. As a result, visitation would increase at the remaining unmanaged forest areas in the region.

Timber management activities would result in an irretrievable loss of solitude, serenity and/or isolation in some areas. A loss of some recreational opportunities would follow.

IMPACTS ON CULTURAL RESOURCES

Complete field surveys of the SCCSYUs to identify paleontologic and archeologic sites have not been undertaken. However, a complete field survey of cultural resources as part of the environmental assessments would precede each timber management action that would result in ground disturbance or the alienation of title (BLM Manual 8100, Cultural Resource Management). Under the proposed action and all alternatives, protection would be provided in accordance with the National Historic Preservation Act of 1966 and Executive Order 11593, as stated in the Code of Federal Regulations (36 CFR Part 800). There is a considerable likelihood of unidentified cultural resources being inadvertently impacted under the proposed action and all alternatives. The magnitude of potential impacts would be related to timber harvest levels under each alternative.

Effects on Unidentified Sites

Unidentified cultural resources could be impacted due to compaction of soil, physical disturbance of the ground's surface and alteration of the soil's chemical properties by fire, chemical treatment or addition of organic matter (Wildesen 1977). Soil compaction and surface disturbance during any ground manipulation activity would disrupt vertical and horizontal relationships of cultural deposits. Soil compaction also has the potential for destruction of such fragile artifacts as textiles, matting and post molds. Ground disturbance could be expected to cause extensive artifact loss, breakage and churning. Evidence of house pits, fire hearths and vigil quest sites would be obliterated during logging operations. Disturbance also increases the possibility of illegal artifact removal by collectors. Chemical alteration of sites, materials and soil usually occurs after harvest activities are complete and during slash disposal and site preparation. Fire could destroy combustible items and adversely alter lithic and ceramic artifacts by

introducing color, textural and thermal radiation changes. In some cases, artifact fragmentation may result. Charcoal would contaminate Carbon 14 dating samples and pollen. These data sources would become unreliable for scientific information. Fire also destroys root systems and stumps of removed trees, creating slumpage of the site surface. Further reduction of site integrity would result.

It is not now possible to estimate the number of unidentified sites that could be impacted. However, potential archeologic site disturbance would be greater in those areas where more than 10 sites per square mile can be expected (e.g., south of the Middle Fork of the Coquille River). Interior prehistoric sites are often entirely on the surface or extremely shallow, and timber harvest would destroy much of an unidentified site's scientific value.

In a worse case, structural remains and subtle indications of prehistoric activity (e.g. pits used to trap elk, stone blinds and diverting walls used to ambush big game, vigil quest sites, house pit remains) would be completely obliterated. Prehistoric sites with subsurface deposits would be severely impacted within the top 20 inches of the deposit.

Effects on Known Sites

Road construction under the proposed action and alternatives would provide access to cultural sites, resulting in increased visitation. Vandalism, looting, site damage and site erosion could result. Esthetic, recreational, interpretive and educational qualities of the sites could be degraded. Road construction and/or timber removal on slopes above sites could also result in increased rates of erosion and soil slumpage within the site.

The alteration of the landscape and vegetation near cultural sites would create impacts. The disturbance of a site's visual setting would reduce its esthetic appeal and recreational, interpretive and educational potential. Table 3-14 identifies 39 known sites which may have visual setting impacts as a result of timber sales proposed in the 5-year sale plan. VRM program constraints would be complied with to greatly mitigate adverse impacts to site settings.

Conclusions

Appropriate measures would be taken to identify and protect cultural sites prior to ground-disturbing activities under the proposed action and all alternatives. Unidentified archeological sites would be susceptible to considerable alteration due to artifact breakage or destruction, displacement of most horizontal and vertical relationships and contamination of all other organic materials which compose a site's major scientific values. Cultural site damage or destruction would be irreversible and irretrievable.

Once a site is found, however, mitigation measures will be instituted to ensure that any future damage is minimized or avoided. Sites discovered before logging would be withdrawn and managed to protect scientific and/or interpretive values. Site preparation, especially burning, would be deferred for areas in which sites are located after timber harvest. Further, increased surveillance would prevent site damage due to amateur collectors or unexpected erosion.

Table 3-14 Timber Sales Proposed in 5-Year Sale Plan Within One Mile of Cultural Resources

Archeological Site	Management Jurisdiction	Significance/Attributes [1/]	Sales Within One Mile
Floras Creek Village Site	Other	S-1; Damaged by logging	84-42
Bravo Creek Campsite [2/]	BLM	S-1	82-32;83-40
North Fork Chetco Site [3/]	BLM	S-2	82-32;83-40
North Fork Chetco Site	BLM	S-3	82-32;83-40
North Fork Coquille Site [2/]	BLM	S-2	85-22
Brewster Valley Encampments	Other	No data; probable site area	83-41;86-32
Brummet Creek Rockshelter	Other	High site probability	83-41;86-32
Scottsburg Fishery and Villages	Other	S-3	86-14
Smith River Fishery	Other	S-3	82-6
Historic Site			
Ash Valley	Other	S-3	82-14
Carpenter Fir	BLM	S-3	86-6
Hooker Road [4/]	BLM	S-2	82-5;86-4
Oxbow Burn	BLM	S-3	82-10;83-10;84-9; 85-1;85-3;85-4;86-6
Scottsburg [2/]	Other	S-2	86-14
Hedden Store [5/]	Other	S-1	86-14
Vincent Creek Logging	Other	S-2	83-2;85-1
Daniels Creek Railroad	BLM	S-2	84-19;85-16
Splash Dams	Other	S-2	82-18;83-16;84-20
Ren Smith Logging Camp	BLM	S-2	84-19
Plank Logging Roads	BLM	S-3	86-18
Lillian Coal Mine	BLM	S-3	82-17
Blue Ridge Railroad [2/]	BLM	S-2	83-22;85-19
Pleasant Hill School [3/]	Other	S-2	84-36;85-33
Gearhart House [3/]	Other	S-2	84-36;85-33
Mast House [3/]	Other	S-2	84-23
Mast Barn [3/]	Other	S-1	84-23
Schletter Telegraph Line	BLM	S-3	83-24,26,27,41;84-23,38;
Coos Bay Wagon Road [2/]	BLM	S-1	Same as for Site #040
Brewster Valley Settlement	Other	S-2	83-41
Brewster Trail/Wagon Ruts	BLM	S-3	84-25;84-27
N. Fork Logging Railroad	BLM	S-2	82-23,83-25,83-28;86-23
Powers-Coos Bay Railroad	BLM	S-2	83-36;86-41
Sandy Creek Covered Bridge [5/]	Other	S-2	83-44
Camas Valley-Big Bend Trail	BLM	S-3	83-45
Enchanted Prairie	BLM	S-3	83-34
Langlois-Myrtle Point Wagon Road	Other	S-3	86-30
Middle Fork Logging Practices	BLM	S-3	82-33
Eckley [2/]	BLM	S-1	86-30
Middle Fork Road	BLM	S-2	83-30,33,34,44,45

1/ Definitions of CRES significance ratings for archeological resources follow:

S-1. National Register Significance. In general, S-1 properties show a clear potential for yielding, or have yielded, highly significant scientific/educational information and are clearly important in terms of national, State or local prehistory.

S-2. Mid-Significance. S-2 properties are usually not particularly unique, representative, nor do they have important associations. The condition of the property usually is only fair. These kinds of properties are often large but do not have great antiquity and only limited depth potential.

S-3. Low Significance. The S-3 rating is assigned if the main worth of the property is its potential for contributing data in regards to solving larger problems, such as reconstruction of paleo-environments and areal human usage patterns. These kinds of properties usually show little if any depth, no or very few features, may have great antiquity but be very small, or may be very large but show no great antiquity or concentration of materials.

S-4. Data Property. The S-4 rating is assigned only to properties that have been totally destroyed.

Definitions for CRES significance ratings S-1 to S-4 for historical resources follow:

S-1. National Register Significance. In general, S-1 properties show a clear potential for yielding, or have yielded, highly significant scientific/educational information and are clearly important in terms of national, State, or local history. Normally the S-1 rating will be assigned to those properties which are in relatively good condition, and are unique or representative, and/or have important associations.

S-2. Mid-Significance. Assigned if resource does not satisfy S-1 requirements. S-2 properties are usually in only fair condition. They are not particularly unique, representative, nor do they have important associations. Many recently abandoned western homesteads, small mining camps, cemeteries, railbeds, roads and trails will fall here.

S-3. Low Significance. Assigned if the main worth of the property is its potential for contributing data in regards to solving larger problems of areal human usage and environment. Properties such as dumps, isolated domestic and non-domestic buildings and materials, small mining operations, will often fall here.

S-4. Data Property. The S-4 rating is assigned only to properties that have no physical remains in the field and/or have lost field integrity.

2/ BLM plans to evaluate site to determine if eligibility criteria is met for nomination to the National Register of Historic Places.

3/ BLM is pursuing cooperative agreements with site owners for site preservation and maintenance.

4/ National Register nomination possible with Site No. 010, Hedden Store

5/ BLM is encouraging private owner consent to approve nomination to the National Register.

No direct impacts would occur to known sites eligible for nomination to the National Register. However, the setting integrity of some highly significant sites may be degraded as timber management activities take place in proximity to the sites. Interpretive, educational, recreational potential and esthetic appeal of these sites could decrease considerably.

IMPACTS ON VISUAL RESOURCES

Most timber management practices disrupt the land surface, and change surface vegetative patterns and species composition. This creates visible contrasts to the existing environment.

The degree of contrast can be evaluated by separating the landscape into its major features (land and water surface, vegetation and structures), and then predicting the magnitude of change in contrast of each of the basic elements (form, line, color and texture) for each of the features (BLM Manual 8431).

VRM contrast ratings are applied to proposed land management activities on public lands which disturb the soil, change or remove vegetation, or place a structure in the landscape. They can also be used in the design of rehabilitation and enhancement measures to mitigate visual intrusions created by timber management activities. Environmental assessments address the application of the contrast rating system to specific timber management actions.

Assessing the amount of contrast for a proposed activity can give a good indication of the severity of impact and serve as a guide in determining what is required to reduce the contrast to the point where it will meet the criteria for the visual resource management classes of the area (BLM Manual 8440). If necessary, the timber sale can be redesigned with a landscape architect's input to achieve compliance with the allowable VRM class limits.

Timber Management Treatments

Clearcutting has significant adverse impacts on esthetic values (Marshall 1925; Smith 1962; Douglas 1965). Uniform colored and textured forest vegetative patterns are especially vulnerable to adverse visual impacts from clearcutting. Clearcutting would create strongly contrasting geometric forms and lines, as well as vegetative color and texture patterns on the acres to be clearcut under the proposed action and alternatives. The overall magnitude of impacts varies between Alternative 3 (23,380 acres) and Alternative 1 (41,773 acres). Clearcut units adjacent to old growth/second growth forested landscape would produce long-term visual impacts. However, overall scenic quality is also dependent on forest management activities on intermingled private land. In some cases, clearcutting would be consistent with surrounding areas and would not create significant additional contrasts. Under the proposed action and Alternatives 3,4,5,6 and 7, the form and size of individual clearcut units would be constrained to meet objectives for VRM Classes II and III.

Table 3-14 Timber Sales Proposed in 5-Year Sale Plan Within One Mile of Cultural Resources

Archeological Site	Management Jurisdiction	Significance/Attributes [1]	Sales Within One Mile
Floras Creek Village Site	Other	S-1; Damaged by logging	84-42
Bravo Creek Campsite [2]	BLM	S-1	82-32;83-40
North Fork Chetco Site [3]	BLM	S-2	82-32;83-40
North Fork Chetco Site	BLM	S-3	82-32;83-40
North Fork Coquille Site [2]	BLM	S-2	85-22
Brewster Valley Encampments	Other	No data; probable site area	83-41;86-32
Brummet Creek Rockshelter	Other	High site probability	83-41;86-32
Scottsburg Fishery and Villages	Other	S-3	86-14
Smith River Fishery	Other	S-3	82-6
Historic Site			
Ash Valley	Other	S-3	82-14
Carpenter Fir	BLM	S-3	86-6
Hooker Road [4]	BLM	S-2	82-5;86-4
Oxbow Burn	BLM	S-3	82-10;83-10;84-9; 85-1;85-3;85-4;86-6
Scottsburg [2]	Other	S-2	86-14
Hedden Store [5]	Other	S-1	86-14
Vincent Creek Logging	Other	S-2	83-2;85-1
Daniels Creek Railroad	BLM	S-2	84-19;85-16
Splash Dams	Other	S-2	82-18;83-16;84-20
Ren Smith Logging Camp	BLM	S-2	84-19
Plank Logging Roads	BLM	S-3	86-18
Lillian Coal Mine	BLM	S-3	82-17
Blue Ridge Railroad [2]	BLM	S-2	83-22;85-19
Pleasant Hill School [3]	Other	S-2	84-36;85-33
Gearhart House [3]	Other	S-2	84-36;85-33
Mast House [3]	Other	S-2	84-23
Mast Barn [3]	Other	S-1	84-23
Schletter Telegraph Line	BLM	S-3	83-24,26,27,41;84-23,38;
Coos Bay Wagon Road [2]	BLM	S-1	Same as for Site #040
Brewster Valley Settlement	Other	S-2	83-41
Brewster Trail/Wagon Ruts	BLM	S-3	84-25;84-27
N. Fork Logging Railroad	BLM	S-2	82-23,83-25,83-28;86-23
Powers-Coos Bay Railroad	BLM	S-2	83-36;86-41
Sandy Creek Covered Bridge [5]	Other	S-2	83-44
Camas Valley-Big Bend Trail	BLM	S-3	83-45
Enchanted Prairie	BLM	S-3	83-34
Langlois-Myrtle Point Wagon Road	Other	S-3	86-30
Middle Fork Logging Practices	BLM	S-3	82-33
Eckley [2]	BLM	S-1	86-30
Middle Fork Road	BLM	S-2	83-30,33,34,44,45

1/ Definitions of CRES significance ratings for archeological resources follow:

S-1. National Register Significance. In general, S-1 properties show a clear potential for yielding, or have yielded, highly significant scientific/educational information and are clearly important in terms of national, State or local prehistory.

S-2. Mid-Significance. S-2 properties are usually not particularly unique, representative, nor do they have important associations. The condition of the property usually is only fair. These kinds of properties are often large but do not have great antiquity and only limited depth potential.

S-3. Low Significance. The S-3 rating is assigned if the main worth of the property is its potential for contributing data in regards to solving larger problems, such as reconstruction of paleo-environments and areal human usage patterns. These kinds of properties usually show little if any depth, no or very few features, may have great antiquity but be very small, or may be very large but show no great antiquity or concentration of materials.

S-4. Data Property. The S-4 rating is assigned only to properties that have been totally destroyed.

Definitions for CRES significance ratings S-1 to S-4 for historical resources follow:

S-1. National Register Significance. In general, S-1 properties show a clear potential for yielding, or have yielded, highly significant scientific/educational information and are clearly important in terms of national, State, or local history. Normally the S-1 rating will be assigned to those properties which are in relatively good condition, and are unique or representative, and/or have important associations.

S-2. Mid-Significance. Assigned if resource does not satisfy S-1 requirements. S-2 properties are usually in only fair condition. They are not particularly unique, representative, nor do they have important associations. Many recently abandoned western homesteads, small mining camps, cemeteries, railbeds, roads and trails will fall here.

S-3. Low Significance. Assigned if the main worth of the property is its potential for contributing data in regards to solving larger problems of areal human usage and environment. Properties such as dumps, isolated domestic and non-domestic buildings and materials, small mining operations, will often fall here.

S-4. Data Property. The S-4 rating is assigned only to properties that have no physical remains in the field and/or have lost field integrity.

2/ BLM plans to evaluate site to determine if eligibility criteria is met for nomination to the National Register of Historic Places.

3/ BLM is pursuing cooperative agreements with site owners for site preservation and maintenance.

4/ National Register nomination possible with Site No. 010, Hedden Store

5/ BLM is encouraging private owner consent to approve nomination to the National Register.

No direct impacts would occur to known sites eligible for nomination to the National Register. However, the setting integrity of some highly significant sites may be degraded as timber management activities take place in proximity to the sites. Interpretive, educational, recreational potential and esthetic appeal of these sites could decrease considerably.

IMPACTS ON VISUAL RESOURCES

Most timber management practices disrupt the land surface, and change surface vegetative patterns and species composition. This creates visible contrasts to the existing environment.

The degree of contrast can be evaluated by separating the landscape into its major features (land and water surface, vegetation and structures), and then predicting the magnitude of change in contrast of each of the basic elements (form, line, color and texture) for each of the features (BLM Manual 8431).

VRM contrast ratings are applied to proposed land management activities on public lands which disturb the soil, change or remove vegetation, or place a structure in the landscape. They can also be used in the design of rehabilitation and enhancement measures to mitigate visual intrusions created by timber management activities. Environmental assessments address the application of the contrast rating system to specific timber management actions.

Assessing the amount of contrast for a proposed activity can give a good indication of the severity of impact and serve as a guide in determining what is required to reduce the contrast to the point where it will meet the criteria for the visual resource management classes of the area (BLM Manual 8440). If necessary, the timber sale can be redesigned with a landscape architect's input to achieve compliance with the allowable VRM class limits.

Timber Management Treatments

Clearcutting has significant adverse impacts on esthetic values (Marshall 1925; Smith 1962; Douglas 1965). Uniform colored and textured forest vegetative patterns are especially vulnerable to adverse visual impacts from clearcutting. Clearcutting would create strongly contrasting geometric forms and lines, as well as vegetative color and texture patterns on the acres to be clearcut under the proposed action and alternatives. The overall magnitude of impacts varies between Alternative 3 (23,380 acres) and Alternative 1 (41,773 acres). Clearcut units adjacent to old growth/second growth forested landscape would produce long-term visual impacts. However, overall scenic quality is also dependent on forest management activities on intermingled private land. In some cases, clearcutting would be consistent with surrounding areas and would not create significant additional contrasts. Under the proposed action and Alternatives 3,4,5,6 and 7, the form and size of individual clearcut units would be constrained to meet objectives for VRM Classes II and III.

Table 3-15 summarizes the potential conflicts of the proposed action's 5-year timber sale plan with areas of high visual sensitivity, high scenic quality, and/or foreground-middleground distance zones. The potential adverse impacts are most significant in such areas as Highways 38 and 42, the Coos Bay Wagon Road, Loon Lake, Smith and Umpqua Rivers. Impacts may be minimal because of the management activities on intermingled private lands. Environmental assessments will address each BLM timber management action and apply the contrast rating system to maintain the VRM class standards approved in the land use plan.

Thinning produces short-term adverse visual impacts by modifying vegetative texture. However, forest esthetic value is related to vegetative variety, density and depth of view (Methven 1974). In the long-term, thinning could enhance the scenic quality of the landscape. The proposed action and all alternatives propose thinning, with impacts least apparent under Alternative 3 and most apparent under Alternatives 1 and 2.

Yarding would produce short and long-term adverse alterations of the landscape through disturbance of soil and forest undergrowth.

Impacts of road construction would be both adverse and beneficial. Road construction would create strong long-term visual contrasts, mostly linear in nature. Soils exposed on landings and in road cut-and-fill slopes are significant intrusions. Adverse visual impacts would be greatest under Alternative 8 and least under Alternative 3. Hydromulching road cut and fill slopes serves to minimize adverse visual impacts. The location of roads on ridgelines would also serve to minimize impacts. Road construction and maintenance could also be beneficial by providing or improving scenic access and viewpoints, and focusing attention on scenic features.

Although timber harvest debris is visually objectionable, slash burning would result in adverse impacts. Burning produces short-term adverse contrasts on the burned area as well as through the effects of smoke on visibility (see Impacts on Air Quality). The proposed action and all alternatives call for some burning and the magnitude of impacts under each alternative would be relative to the amount of burning proposed.

Herbicide application to reduce competition of herbaceous or woody vegetation prior to or following planting would create strong contrasts from dead vegetation in the short-term. Herbicides encourage conifers at the expense of other vegetation of high visual interest (e.g., madrone, rhododendron, huckleberry, Oregongrape, dogwood). The long-term visual effect of herbicide use is a reduction of vegetative variety. These impacts would occur under all alternatives except Alternative 4.

Table 1-3 illustrates the constrained timber production base under the proposed action and each alternative. Older minimum harvest ages are employed, according to VRM class, in recognition of visual resource needs. Under Alternatives 1 and 2, no land would be allocated to the constrained timber production base for visual resource management. Visual values would be severely degraded under these alternatives. An allocation of 2,681 acres to visual resource management under Alternative 8 would provide only minimal

Table 3-15 Potential Conflicts Between the 5-Year Sale Plan and Visual Resources

Timber Sale	General Visual Sensitivity Location	Impact Analysis 1/ Remarks	VRM Class
82-6	Smith River Falls	B,C	II
82-10	Smith River	C	III
82-14	Loon Lake	A,B,C	II, III
82-17	Highway 101 & Coos Bay	A, C	III, IV
82-25	County road and rural residence	C	III, IV
82-28	County road and rural residence	C	III, IV
82-29	Sandy Creek County Road	C	IV
82-30	County road and rural residence	C	IV
82-31	Pacific Ocean	A, C	III
82-32	Palmer Butte & Gardner Ridge Road	B,C	III,IV
82-35	Sandy Creek County Road	C	IV
83-2	Smith River	C	III
83-5	Highway 38 and Umpqua River	A, C	III
83-11	Highway 38 and Umpqua River	A, C	III, IV
83-12	Loon Lake	A, C	III
83-14	Highway 38 and Umpqua River	A, C	III, IV
83-22	County road and rural residence	C	III, IV
83-24	Coos Bay Wagon Road	C	III
83-27	Coos Bay Wagon Road	C	III
83-30	Highway 42	A, C	II
83-32	Coos Bay Wagon Road	C	IV
83-33	Highway 42	A, C	II
83-36	Powers Highway and rural residence	A	III, IV
83-40	Palmer Butte and Gardner Ridge Roads	C	III, IV
83-40	Chetco River and rural residence	A, C	III
83-41	Coos Bay Wagon Road	C	III
83-42	County road and rural residence	C	IV
83-44	Highway 42	A, C	II, III
83-45	Highway 42	A, C	II
84-3	Smith River	C	III
84-5	Highway 38 and Umpqua River	A, C	III
84-10	Roman Nose Mountain	B	III
84-12	Highway 38 and Umpqua River	A, C	II,III,IV
84-13	Highway 38 and Umpqua River	A, C	II, IV
84-23	Coos Bay Wagon Road	C	III
84-23	County road and rural residence	C	III
84-28	County road and rural residence	C	III, IV
84-29	Sandy Creek County Road	C	IV
84-31	Sandy Creek County Road	C	III, IV
84-33	Sandy Creek County Road	C	IV
84-34	Sandy Creek County Road	C	III, IV
84-35	Coos Bay Wagon Road	C	IV
84-36	County road and rural residence	C	III
84-37	Sandy Creek County Road	C	IV
84-38	Coos Bay Wagon Road	C	III, IV
84-40	Palmer Butte and Gardners Ridge Road	C	IV
85-1	Smith River	C	III
85-10	Roman Nose Mountain	B	III
85-19	County road and rural residence	C	IV
85-22	Coquille-LaVerne Park County Road	A, C	III
85-28	Highway 101	B	III
85-29	Rogue River and tourist resort	A,B,C	III
85-31	Sandy Creek County Road	C	IV
85-32	Sandy Creek County Road	C	III, IV
85-33	County road and rural residence	C	III, IV
85-39	Sandy Creek County Road	C	III, IV
86-1	Highway 38 and Umpqua River	A, C	II, IV
86-6	Smith River	C	III
86-12	Roman Nose Mountain	B	III
86-14	Lower Umpqua	A,B,C	II,III,IV
86-22	Coos Bay Wagon road	C	III
86-25	County Road and rural residence	C	IV
86-32	Coos Bay Wagon Road	C	III
86-34	Sandy Creek County Road	C	III, IV
86-41	Powers Highway and rural residence	A, C	III, IV

1/ Impact would occur in:
- A - Area of high user interest in visual resources and concern for changes in the existing landscape character.
- B - Highly scenic unit.
- C - Area seen from a travel route or sensitivity area up to 3 miles away (foreground - middleground).

protection of some highly scenic visual resources. Alternative 3 is most protective of visual resources, since all 63,900 acres identified as highly scenic and/or visually sensitive would be allocated to the constrained timber production base. Under the proposed action and Alternatives 4, 5, 6 and 7, the allocation of 24,142 acres to the constrained timber production base would serve to protect certain highly scenic and/or visually sensitive visual resources. This protection would occur to a full extent in foreground visual distance zones, and to a lesser extent in middleground, background and seldom seen zones. This would include areas seen from major travel routes such as Highways 38, 42 and U.S. 101 as well as from recreation use areas such as Loon Lake and the Oregon Coast.

Conclusions

Clearcutting, thinning, yarding, road construction, burning and herbicide application would create significant landscape alterations.

The BLM's contrast rating system is to be applied to specific timber management actions to assess the severity of impact. The most effective means of mitigating the impact would be determined and the BLM would attempt to make the proposed project meet the VRM class requirements of the area.

Visual values would be severely degraded under Alternatives 1 and 2. Alternative 8 provides only minimal protection of some highly scenic visual resources. Conversely, Alternative 3 calls for a high degree of protection for all highly scenic and/or visually sensitive visual resources. Under the proposed action and Alternatives 4, 5, 6, and 7, certain highly scenic and/or visually sensitive visual resources would be protected. However, low to moderate adverse impacts to esthetic quality would occur in middleground, background and seldom seen visual distance zones under the proposed action and Alternatives 4, 5, 6 and 7.

The short-term use of timber would result in some impacts on long-term productivity. The loss of old-growth timber on lands contained in the intensive timber production base would change the visual resource, especially for direct contact viewers. The emergent change would be toward a regulated forest with an even distribution of acreage among younger age classes. The perceived value of this change would vary, depending on the observer. Loss of old-growth character may be considered a long-term degradation of the viewer's experience, especially in the foreground and to a lesser extent for middleground landscapes. The change would not be very apparent in background landscapes.

IMPACTS TO ECOLOGICALLY SIGNIFICANT AREAS

Two factors were examined to determine impacts to areas identified as ecologically significant. First, areas were analyzed based upon the TPCC status of public lands within the areas' general boundaries (See Appendix A). A second analysis then determined possible conflicts between the 5-year timber sale plan and ecologically significant areas.

While timber harvest is not planned directly on sensitive sites, general impacts to the areas may be moderate depending upon degree of vegetative disturbance, soil compaction and erosion in proximity to the significant area. Areas containing intensive timber management land would have the potential for significant long-term impacts. In some cases, visual resource, wildlife and other constraints would serve to mitigate impacts to certain areas.

The ecological and biological merits of certain areas would be adversely impacted as result of timber management operations. If other areas with such merits do not exist, the commitment of resources would be irreversible and irretrievable. Table 3-16 summarizes the impacts to ecologically significant areas. Under the proposed action and each alternative, the degree of impacts would be relative to each alternative's emphasis on timber harvest. Impacts would be most likely under Alternative 1 and least likely under Alternative 3.

IMPACTS ON ENERGY USE

Due to the types of equipment employed and the level of treatments included, the proposed action would be considered energy intensive. Table 3-17 indicates the energy investment required, as expressed in British thermal units (Btu's) for the proposed action and alternatives. Energy required for processing of logs into lumber, plywood, etc., is not included since manufacturing costs vary widely depending on mill efficiency. The secondary energy investment for milling is 62,000 Btu's per dollar of manufacturing cost. It is assumed that all energy consumed would be in the form of fossil fuels or derivatives.

The annual energy consumption ranges from 1.089 trillion Btu's (Alternative 3) to 1.881 trillion Btu's (Alternative 1). This energy investment constitutes an irretrievable reduction of dwindling world supplies of petroleum-derived energy. Under the proposed action, about 91 percent of the total 1.565 trillion Btu's is attributable to road development and care (construction, reconstruction, surfacing and maintenance) and log production. Such operations involve heavy equipment and machinery, the energy efficiency of which is dictated by available technology.

If the 1.565 trillion Btu's attributable to the proposed action were all expended in the form of gasoline, it would equate to 12.5 million gallons which amounts to 0.9 percent of the 1,442 billion gallons of gasoline consumed in Oregon during 1978. This energy investment is 0.3 percent of the projected 1979 Oregon total of 574.6 trillion Btu's (Oregon Department of Energy 1980).

There would be no energy consumption attributable to recreational visitor use changes, as total area-wide visitor use would not be significantly impacted under the proposed action or any alternative (See Impacts on Recreation).

Table 3-16 Summary of Impacts to Ecologically Significant Areas

Area	Status of Public Lands within Area Identified	Degree of Potential Longterm Adverse Impact on Public Land	Analysis Remarks	Possible Conflicting Timber Sales (5-year Sale Plan)
Myrtlewood Reserve	210 ac. Other BLM-Administered	None		
Myrtlewood Reserve (Section 5)	210 ac. Other BLM-Administered	None		86-27
Cherry Creek (CS-75)	1,880 ac. Intensively Managed 1,320 ac. Other BLM-Administered	Moderate	Impacts would be to old growth on O & C lands adjacent to the Research Natural Area designated	83-23, 86-24
Humbug Mountain - Sisters Rock	10 ac. Other BLM-Administered	None	VRM Classes II	
Upper Camp Creek	2,380 ac. Intensively Managed 180 ac. Other BLM-Administered	Moderate	O & C lands, VRM Classes III and IV	83-14
Port Orford Cedar Township	6,200 ac. Intensively Managed 460 ac. Other BLM-Administered	Moderate	CBWR lands, VRM Class IV	82-33
Hunter Creek Bog (CU-57)	280 ac. Other BLM-Administered	None	VRM Class III	
Ash Valley, Soup Creek (DO-38)	910 ac. Intensively Managed 50 ac. Other BLM-Administered	Slight	O & C lands, VRM Class II	82-14, 86-13
Wassen Creek and Lake (DO-44)	3,930 ac. Intensively Managed 2,470 ac. Other BLM-Administered	Moderate - Severe	O & C lands, VRM Class IV	82-1, 83-1, 83-3, 84-1, 85-2, 85-3, 86-3
Burnt Ridge Old Forest	1,440 ac. Intensively Managed	Moderate	CBWR lands, VRM Classes III and IV	86-22
Seven Devils Ancient Marine Terrace (CS-1)	40 ac. Intensively Managed	None		
Coos River (CS-80)	620 ac. Intensively Managed	Moderate	CBWR lands, VRM Classes III and IV	84-15
Salt Lick Prairie (CU-9)	160 ac. Intensively Managed	Slight	O & C lands	
Grizzly Mountain (CU-97)	170 ac. Other BLM-Administered	None	VRM Class II	
South Coast Herbland below Euchre Creek (CU-100)	20 ac. Intensively Managed	None	VRM Class II	

Table 3-17 Estimated Annual Energy Consumption
Attributable to the Proposal and Alternatives

Proposed Action

Treatment	Units	Estimated Cost per Unit 1/ ($)	Assumed Energy Requirement per $ of Cost (1,000 Btu's)	Energy Consumption (1,000,000 Btu's)
ROADS				
New Construction	23.4 miles	$100,000	80	187,200
Reconstruction	18.9 miles	30,000	60	34,020
LOG PRODUCTION (all actions taken to cut trees and get logs to the mill)	218,000 M.bd.ft.	100	55	1,199,000
SITE PREPARATION				
Burning	4,296.6 acres	350	31	46,618
Herbicide 2/	900 acres	53	122	6,368
Hand Slashing	683.4 acres	200	30	4,100
Hardwood Stand Conversion	127.6 acres	112	30	429
HERBICIDE				
Plantation Release 2/	4,365 acres	32	122	17,041
PLANTING	5,939.3 acres	100	31	13,412
THINNING				
Precommercial	2,897.6 acres	103	31	9,252
FERTILIZATION 3/	4,255 acres	75	122	38,933
ANIMAL CONTROL	952.7 acres	130	31	3,839
Total				1,565,212

Energy Requirements for the Alternatives

	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	Alt. 8
Total Energy Consumption (1,000,000 Btu's)	1,880,603	1,756,809	1,089,242	1,270,012	1,622,764	1,686,082	1,398,760	1,759,469

1/ BLM estimated costs per units were often a range of values. The listed costs were selected as indicative of the EIS area. Similarly, DOE energy requirements were also given as a range in some cases.

2/ Diesel carrier (when used) has been considered in determining costs and energy requirements for herbicide application.

3/ Costs and energy requirements for fertilization account for the conversion of petroleum-based raw materials for manufacture and energy requirements for delivery and application.

Source: BLM data except for assumed energy requirements per dollar of cost, which was derived by Department of Energy, Region X Staff.

IMPACTS OF HERBICIDES ON HUMAN HEALTH

The possibility of human health being impacted by the proposed use of herbicides on 60,610 acres to be treated is related to the likelihood of exposure and the toxicity of the chemicals proposed for use (Norris 1975).

In general, exposure of humans to herbicides can occur in two ways: directly, as in the case of applicators, or indirectly. The number of persons that could be directly affected by herbicide application in the planning area is very small. Indirect exposure from contact with recently sprayed vegetation or contaminated streams is more likely to occur than is direct contact. Planned delivery techniques would reduce or prevent spray from drifting onto streams and water bodies. Contact with newly sprayed vegetation could occur should someone traverse a sprayed area. However, the effect, if any, of such contact would be minimal.

Particular care would be taken to avoid exposure of the 571 residences within 1 mile of spray areas proposed in the 10-year herbicide plan. Residents within one-half mile would be notified prior to spraying.

The chance that humans exposed to herbicides used in timber management would be adversely impacted is also related to the toxicity of the herbicides. The chemicals (other than 2,4-D) proposed for use are slightly toxic, practically nontoxic or relatively harmless to humans. (USDI, BLM 1978b). Therefore, it is expected that exposure under most circumstances would not result in injury to human beings. Since the likelihood of exposure, both direct and indirect, is small and the chemicals proposed are nontoxic, the impacts of herbicides on human health are minimal.

The low volatile ester of 2,4-D used in timber management is moderately toxic to humans. The use of 2,4-D in forestry has recently been challenged by groups which contend it is hazardous to human health. Some laboratory tests, not substantiated under field conditions where applications levels are lower than in lab tests, indicate that it has potential for chronic effects such as teratogenicity (fetal deformation) (Courtney 1975), fetotoxicity to birds, and carcinogenicity (Hansen et al. 1971). A breakdown component of 2,4-D, 2,4-Dichlorophenol, has been implicated as a co-carcinogen in mice (Boutwell and Bosch 1959 In Shearer and Halter 1980). Careful planning of treatment areas and handling of 2,4-D will minimize the chance of exposure.

In 1978, Frank Dost (USDA, FS 1978b) completed a review of the research literature that described the toxicology of phenoxy herbicides. Dost's review of the toxicity of 2,4-D to humans revealed several incidents of poisoning in humans involving highly concentracted doses of 2,4-D. He also described reports of the effects of 2,4-D esters being absorbed through the skin from accidental spills. Those effects ranged from unusual fatigue, nausea, vomiting and weight loss from first exposures to serious peripheral neurological effects when the victim was exposed a second time.

2,4-Dichlorophenal (2,4-DCP), a breakdown component of phenoxy herbicides, has been found to be incorporated into soil humus complexes by microbial activity. Such xenobiotic compounds may persist in the soil organic matter and constitute a delayed environmental problem (Bollag et al. 1968 In Shearer and Halter 1980). This component (2,4-DCP) has also been found to be an impurity in 2,4-D (Faust and Aly 1963, In Shearer and Halter 1980). Holcombe and Phipps (1979, Cited in Shearer and Halter 1980) found that 3.11 ppm of 2,4-DCP reduced the growth of fish (fathead minnow fry). Laboratory tests show 2,4-DCP to have a half-life in buffered water of 6 days (Ibid).

2,4-DCP, like other polychlorinated phenols, when burned, can form a dioxin, but not TCDD (2,3,7,8 - tetrachlorodibenzo - p - dioxin) which is found in 2,4,5-T and silvex. The most likely dioxin produced from heating, if one should form, would be 2,7 - dichlorodibenzo - p - dioxin, reported to be minimally toxic (Epstein 1970; Schulze et al. 1973, Cited in Shearer and Halter 1980).

The Environmental Protection Agency recently reviewed all the available research about potential health effects of 2,4-D. Based on this review, the EPA concluded that the continued use of 2,4-D does not pose an imminent hazard or unreasonable adverse effect when used according to label precautions and directions for use (U.S. EPA 1980). EPA has asked manufacturers to conduct more tests to bring the knowledge about 2,4-D up to standards currently required for the registration of new chemicals.

IMPACTS ON ECONOMIC CONDITIONS

Increasing efficiency in the timber industry is causing declining employment per unit of production. To separate the losses attributable to productivity gains from the impacts of the various alternative actions, the impacts are measured as the difference between projections based on a continuation of existing programs (Alternative 8) and projections for the other alternative actions.

Short-Term Impacts

Table 3-18 shows projections representing average local employment and earnings dependent on the proposed action and alternatives during the initial decade after implementation. Impacts on employment and earnings would be phased in over a period of 2 or 3 years due to the customary time lag between sale and harvest. Impacts on receipts would be delayed an additional year.

If current management programs were continued during the next 10 years, local timber industry employment attributable to the SCCSYUs would amount to an average of 1,437 workers in the four counties most directly affected. The projection is based on a 234 MM bd.ft. annual cut, which is about 7 percent higher than the 1975-79 average cut of 219.6 MM bd. ft. on which the estimates of existing conditions in Chapter 2 are based. Employment in forest management activities not normally performed in conjunction with logging would amount to the equivalent of 20 full-time jobs, although these activities such as tree planting and brush control are performed on a seasonal and intermittent basis.

Table 3-18 Short Term Impacts on Local Employment and Earnings
(Average annual amounts during first decade, earnings in thousands of 1978 dollars)

	Projected County Total (1985) 1/	Change from No Action Condition								No Action Condition (Alt. 8) 2/
		Proposed Action	Alt. 1 Opt. Tbr.	Alt. 2 Tbr. + Owls	Alt. 3 Opt. Other	Alt. 4 No Herb.	Alt. 5 F.P.O.	Alt. 6 MHS	Alt. 7 No ACE	
Coos County										
Timber industry employment	5,125	-43	+140	+67	-278	-93	-10	+28	-142	798
Forest management 3/	N/A	+10	+12	+10	+4	+10	+10	+10	+9	13
Logging 4/	N/A	-14	+34	+15	-75	-27	-5	+5	-40	208
Timber processing 4/	N/A	-39	+94	+42	-207	-76	-15	+13	-111	577
Total employment 5/	29,000	-112	+364	+174	-723	-242	-26	+73	-369	2,076
Total earnings (x 1,000)	$402,900	-$1,554	+$5,060	+$2,421	-$10,047	-$3,361	-$361	+$1,012	-$5,132	$28,840
Curry County										
Timber industry employment	1,125	-2	+4	+2	-11	-4	-1	+1	-6	31
Forest management 3/	N/A	-	-	-	-	-	-	-	-	1
Logging 4/	N/A	-	+1	+1	-2	-1	-	-	-1	6
Timber processing 4/	N/A	-2	+3	+1	-9	-3	+1	+1	-5	24
Total employment 5/	6,600	-5	+9	+5	-26	-9	-2	+1	-14	73
Total earnings (x 1,000)	$78,300	-$56	+$112	+$56	-$307	-$112	-$28	+$13	-$168	$866
Douglas County										
Timber industry employment	8,875	-27	+83	+41	-166	-57	-7	+17	-85	477
Forest management 3/	N/A	+5	+6	+6	+3	+5	+5	+6	+5	6
Logging 4/	N/A	-7	+17	+8	-37	-13	-2	+3	-19	103
Timber processing 4/	N/A	-25	+60	+27	-132	-49	-10	+8	-71	368
Total employment 5/	40,000	-61	+186	+92	-373	-128	-16	+38	-191	1,071
Total earnings (x 1,000)	$557,600	-$845	+$2,598	+$1,283	-$5,196	-$1,784	-$219	+$532	-$2,661	$14,930
Lane County										
Timber industry employment	14,000	-9	+21	+9	-47	-18	-4	+2	-26	131
Forest management 3/	N/A	-	-	-	-	-	-	-	-	-
Logging 4/	N/A	-	-	-	-	-	-	-	-	-
Timber processing 4/	N/A	-9	+21	+9	-47	-18	-4	+2	-26	131
Total employment 5/	140,800	-27	+63	+27	-141	-54	-12	+6	-78	393
Total earnings (x 1,000)	$1,769,200	-$339	+$792	+$339	-$1,772	-$679	-$151	+$75	-$980	$4,940
Local Area Total										
Timber industry employment	29,125	-81	+248	+119	-502	-172	-22	+48	-259	1,437
Forest management 3/	N/A	+15	+18	+16	+7	+15	+15	+16	+14	20
Logging 4/	N/A	-21	+52	+24	-114	-41	-7	+8	-60	317
Timber processing 4/	N/A	-75	+178	+79	-395	-146	-30	+24	-213	1,100
Total employment 5/	216,400	-205	+622	+298	-1,263	-433	-56	+118	-652	3,613
Total earnings (x 1,000)	$2,808,000	-$2,794	+$8,562	+$4,099	-$17,322	-$5,936	-$759	+$1,632	-$8,691	$49,576

1/ Employment projections from Bonneville Power Administration, Oregon Population, Employment and Households Projected to 2000, September 1979.

2/ No action condition reflects the amount of employment and income expected to be generated under the existing program.

3/ See Appendix J for calculation of forest management employment. These estimates represent the employment of workers normally classified in other industries but included in the timber manufacturing industry here for convenience because of their small values.

4/ Estimated from ratios of employment per MM board feet developed in Chapter 2, and adjusted for productivity gains for the period 1976-1985 at the approximate rates shown in the CCD Economic Improvement Association paper "Projection of Future Job Losses in the Timber Industry...". These approximations are for logging, 1 percent per year, and for processing, 1.34 percent per year.

5/ For the various alternatives, total employment includes the changes in employment in other industries resulting from the change in timber industry employment (also included).

The total employment generated in the four-county area by a continuation of current SCCSYUs management would average 3,216 workers. It is noted that an estimate of total employment generated in Douglas County by use of a different analysis (Beaton and Hibbard 1977) would be about 14 percent higher than the Douglas County estimate developed here. (Impact estimates would be similarly affected). The higher estimate represents an alternative perspective, but its use would result in a distorted representation of the impacts among counties in the absence of comparable estimates for the other counties involved.

Income generated in the four counties as measured by worker earnings would average about $49,576,000 in 1978 dollars. (An estimate for Douglas County based on the Beaton and Hibbard study would be about 8 percent higher.)

The proposed action would cause the net loss of 81 jobs in the timber industry. The combined loss of 96 jobs in logging and timber processing industries would be partially offset by the equivalent of 15 new jobs in forest management activities. Unemployed timber workers would be unlikely to seek forest management jobs. The losses of logging and processing jobs would be most severe in Coos County where they would amount to about 1 percent of timber industry employment. Local employment in total and local earnings would be affected to a minor degree in all counties. In no case would the impact exceed 0.5 percent of the county total.

The employment and earnings impacts of other alternatives are shown in Table 3-18. Alternative 3 would have the largest negative impacts, causing losses of about 0.6 percent of total employment and earnings in the four-county area as a whole, including losses of 2.5 percent in Coos County and almost 1 percent in Douglas County. Alternative 1 would have the largest positive impacts, increasing timber industry employment in the four-county area by about 0.9 percent and total employment and earnings about 0.3 percent.

Impacts of the magnitudes described above would be small in comparison with the seasonal and cyclical variations normally experienced in the area. Job losses in the timber industry would probably occur mainly in the part of the work force supplying the seasonal and cyclical needs of the industry.

Local employment and income related to hunting, fishing and other recreation activities would not be significantly affected by any of the alternatives.

O&C revenues from the SCCSYUs would be affected by each of the alternatives approximately in direct proportion to the change in annual timber harvest. Since all O&C monies are combined in a common fund, the effect of any change in local revenues is shared equally by all O&C fund participants. The proposed action would reduce O&C revenues from the SCCSYUs by 6.8 percent and total O&C revenue by 1.2 percent. In terms of 1979 (FY) O&C receipts in Coos Bay District, the reduction would amount to $2,357,000. O&C fund participants--O&C counties, BLM and the Federal treasury--would each receive their proportionate share of the reduced receipts. Alternative 3 would reduce total O&C revenue (and distributions) by 6.5 percent, the maximum impact that any of the alternatives would have.

Property tax revenues from CBWR lands would not be affected by the proposed action or alternatives. Severance taxes on timber harvested from CBWR lands are assumed to be affected in direct proportion to changes in harvest levels for the SCCSYUs as a whole. Only two local governments in Coos County, School District #41 and the Port of Coquille, are heavily dependent on revenues from CBWR lands and likely to be affected by such changes. Changes in CBWR severance taxes and their effects on revenues of these two districts as a percentage of levies are shown in Table 3-19. The change in revenues for all other local governments combined amount, to $11,000, based on 1979 fiscal year payments.

Long-Term Impacts

Long-term impacts for each alternative would generally be very similar to short-term impacts. Impacts on local employment and earnings would be reduced in amount by about 12 percent per decade if productivity trends in the timber industry are sustained. The anticipated reduction in timber industry activity due to the curtailment of private timber supplies would make the impacts larger in relation to the timber industry. Timber industry employment in the four counties would total only 15,500 in the second decade (1995) if harvests were to decline by 35 percent as suggested by Beuter (1976).

Impacts for Alternative 5 would differ in sucessive decades. In the second decade total employment would be increased by about 145 workers, and in the third decade, by 190 workers. These increases would be small compared with losses in the timber industry due to prospective productivity gains and private harvest reductions. Since the proposed cut could not be sustained beyond the third decade, total employment would be reduced (from the level expected under Alternative 8) by 880 workers in the fourth decade.

Cumulative Impacts

The cumulative impacts resulting from the alternatives for SCCSYUs in combination with the adoption of new timber management plans announced for the Josephine, Jackson and Klamath Sustained Yield Units of BLM's Medford District have been examined. These impacts would be additive, that is, they would be the sum of the impacts of the individual actions.

The cumulative impacts on employment and income would be most important for Douglas County. The impacts of Medford District's new timber management plans will reduce Douglas County timber industry employment by 1.2 percent and total income and employment by 0.5 percent in addition to the impacts previously described for the SCCSYUs program alternatives.

Table 3-19 Change in Timber Severance Taxes, School District #41 and Port of Coquille [1/] (1979 Data)

Alternative	School Dist. #41			Port of Coquille		
	Amount of Tax	Change from No Action Condition	Change as Percent of 1979-80 Levy	Amount of Tax	Change from No Action Condition	Change as Percent of 1979-80 Levy
Proposed Action	$313,039	$ -22,975	- 4.0	$1,977	$-145	- 2.9
1 Optimize Timber	390,581	+54,567	+ 9.5	2,467	+345	+ 7.0
2 Timber and Owls	360,426	+24,412	+ 4.2	2,276	+154	+ 3.1
3 Optimize Other	215,394	-120,620	-21.0	1,360	-762	-15.4
4 No Herbicides	291,499	-44,515	- 7.7	1,841	-281	- 5.7
5 Oregon Forest Program	327,398	- 8,616	- 1.5	2,068	- 54	- 1.1
6 Minimum Harvest Size	343,194	+ 7,180	+ 1.2	2,167	+ 45	+ 0.9
7 No ACE	271,396	-64,618	-11.2	1,714	-408	- 8.3
8 No Action	336,014	-	-	2,122	-	-

1/ Taxes estimated by adjusting 1979 collections to reflect proposed harvest level and change measured as difference from Alternative 8 (No Action). The 1979 harvest was 231.1 MM bd. ft. 1979-80 property tax levies were $575,038 for School District #41 and $4,944 for the Port of Coquille.

The Medford District's new plans will reduce total O&C revenues and distributions by about 2.8 percent in the short-term. This amounts to about 5 to 6 million dollars. The cumulative impact with the proposed action would amount to a 4 percent reduction, or around $8 million. This reduction would be equivalent to an average of 10 cents per $1,000 of assessed value and 0.4 percent of total levies for all O & C counties. As a percentage of total levies in Coos, Curry, Douglas, Jackson, Josephine and Lane Counties, it would amount to 1.2 percent, 3.7 percent, 4.1 percent, 1.6 percent, 3.6 percent and 0.5 percent, respectively. The most severe cumulative impact would be a 9.2 percent reduction of O&C revenues if Alternative 3 were adopted. The cumulative impact of Alternative 1 would be a slight increase in O&C revenues.

IMPACTS ON SOCIAL CONDITIONS

Social impacts of the alternatives are heavily dependent on community and individual perceptions which may be based on incomplete or inaccurate knowledge. The perceived effects on economic welfare are a major social concern heightened by currently high unemployment rates and an expected long-term decline in the area's principal industry. Any action causing a loss of employment would be viewed adversely by some public sectors.

Under these circumstances, concern over employment reductions associated with the proposed action and alternatives is likely to dominate public reaction to the alternative plans.

Workers losing employment in the timber industry would probably be members of the peripheral work force used to fill temporary labor needs and thus would have less social adjustment to make than long-term core workers would.

According to a survey cited in Chapter 2, a majority of southern Oregon residents would not favor a reduction in timber cut. They would favor increased wildlife habitat and more hunting and fishing opportunities.

The use of herbicides is controversial due to fears of health damage on the part of some residents as opposed to economic benefits in timber production.

Underlying conflict between people with personal economic interests and those with health, esthetic or recreational interests may be increased. The impacts of specific treatments on personal and community values would depend in part on the locations of treatment application, the manner in which BLM communicates and negotiates its actions with affected residents, and the adaptibility of those who are affected.

Local residents would be affected by their perception of the degree of control they exercise over local affairs. In the absence of full knowledge and understanding of plans, a majority of the public is likely to feel that their concerns have not been adequately addressed and that they have reduced control over local affairs.

LIST OF AGENCIES, ORGANIZATIONS AND PERSONS TO WHOM COPIES OF THE STATEMENT ARE SENT

Comments on the draft environmental statement have been requested from the following:

Federal Agencies

Advisory Council on Historic Preservation
Department of Agriculture
- Forest Service
- Soil Conservation Service

Department of Commerce
- National Marine Fisheries Service

Department of Defense
- U.S. Army Corps of Engineers

Department of Energy
- Region X

Department of the Interior
- Fish and Wildlife Service
- Geological Survey
- Heritage Conservation and Recreation Service
- National Park Service
- Bureau of Mines
- Water and Power Resources Service

Small Business Administration
Environmental Protection Agency

State and Local Government

Oregon State Clearinghouse
Oregon Regional Clearinghouses
- Lane Council of Governments
- Umpqua Regional Council of Governments
- Coos-Curry Council of Governments

Oregon State Historic Preservation Officer
Boards of County Commissioners
- Coos County
- Curry County
- Douglas County
- Lane County

Interest Groups (partial listing)

American Forest Institute
Associated Oregon Industries
Association of O&C Counties
Cascade Holistic Economic Consultants
Friends of the Earth
Industrial Forestry Association
Izaak Walton League
League of Women Voters
Natural Resource Defense Council
National Wildlife Federation
Northwest Environmental Defense Center
Northwest Timber Association
Oregon Environmental Council
Oregon Natural Heritage Program
Oregon Student Public Interest Research Group
Oregon Wilderness Coalition
Sierra Club
Southern Oregon Citizens Against Toxic Sprays
Southern Oregon Resource Alliance
Southern Oregon Timber Industries Association
The Wilderness Society
Western Forest Industries Association
Wildlife Management Institute

Copies of this draft environmental impact statement will be available for public inspection at the following BLM offices:

Washington Office of Public Affairs
18th and C Streets
Washington, D.C. 20240
Phone (202) 343-5717

Coos Bay District Office
333 S. 4th St.
Coos Bay, Oregon 97420
Phone (503) 269-5880

Oregon State Public Affairs Office
729 N.E. Oregon Street
P.O. Box 2965
Portland, Oregon 97208
Phone (503) 231-6277

Reading copies will be placed in the following libraries: Portland State University, Portland; Oregon State University, Corvallis; University of Oregon, Eugene; Lane Community College, Eugene; Southwestern Oregon Community College, Coos Bay; and the Umpqua Community College, Roseburg.

Public hearings will be held in Coos Bay, Oregon, on the adequacy, completeness, and accuracy of this environmental impact statement. The hearings will not address the advantages or disadvantages of the proposed action, but opinions are and will be solicited on the quality of the analysis.

Details of the hearing will be published in the Federal Register and local news sources.

LIST OF PREPARERS

Name	Area of Responsibility
Ron Smith	Team Manager
Richard Bonn	Statement Leader
L.D. Hamilton	Technical Coordinator/Editor
Jeanne Johnson	Editorial Assistant
R. Gregg Simmons	Vegetation, Description of Proposed Action and Alternatives
D.F. Buck, Jr.	Climate, Air Quality, Soils, Water Resources
Phillip D. Havens	Wildlife, Fisheries
Joseph V. H. Ross	Recreation, Cultural Resources, Visual Resources, Wilderness, Ecologically Significant Areas, Energy
John T. Booth	Socioeconomics

Coos Bay District Personnel Providing Substantive Input

Craig Garland	Soils, Water Resources
Douglas Smithey	Wildlife
Reginald Pullen	Cultural Resources
Andrew Wenchel	Recreation, Visual Resources

APPENDICES

APPENDICES

Appendix A

ALLOWABLE CUT DETERMINATION PROCESS

In determination of a sustained yield allowable cut, the primary variables are acres allocated to timber production, applied management constraints, growth capability and enhancement of growth assumed from specific development practices or treatments. Each alternative analyzed in this EIS contains a different mix of variables encompassing a range of choices for decisionmakers as required by the CEQ Regulations (40 CFR 1502.2 (a)).

Following in chronological order are brief descriptions of the inventories and processes employed to determine the allowable cut level for each alternative including the proposed action.

Timber Production Capability Classification

The Timber Production Capability Classification (TPCC) is an intensive inventory process initiated in 1972 to partition all public land administered by BLM in western Oregon into categories based upon the land's physical and biological capacity to produce timber. TPCC was conducted in accordance with Oregon Manual Supplement 5250.

The TPCC identifies commercial forest land which could be managed on a sustained yield basis. This land would form the timber production base for computation of the annual allowable harvest. As new data become available from intensive on-site analysis, management direction for future management plans may be altered on specific tracts.

Analysis of TPCC data disclosed wide variation in production capability of commercial forest lands in the SYUs. Approximately 287,000 acres of land were identified as potentially available for intensive timber production (high intensity lands).

Operations Inventory

For BLM to carry out the timber management program effectively, specific information as to the location and current condition of the various forest types within the land base must be available to the managers. This is accomplished through the Operations Inventory (OI) in accordance with procedures contained in the Operations Inventory Handbook (revised).

The OI is an intensive inventory providing forest type maps which show the location and classification of each homogeneous forest type island. OI record cards list acreage, silvicultural needs and opportunities for application of forest management practices on each type island. Operations Inventory thus provides a basis for establishing priorities for treatment based on stand conditions and productivity.

1978 Forest Reinventory

A reinventory of commercial forest land in the SCCSYUs was completed in 1978 employing procedures for extensive inventory jointly developed by the USFS and BLM (USDA, FS 1976). The reinventory uses the same basic inventory design as was used for determination of the present allowable cut, but with further refinement to include stratification of commercial forest land based on information obtained from the OI and TPCC. Statistical analysis indicates the sample mean volume per acre in the SCCSYUs is within 7 percent of the true mean volume per acre at one standard deviation.

The reinventory indicates a forest distribution as displayed in Table A-1. Age classes range from non-stocked, where reproduction has not been established, to 500 years.

Table A-1 Acres, Age Class, and Volume that Exists Today on High Intensity Timber Management Lands

Age Class	Acres	Total Volume M Cu.Ft.	Age Class	Acres	Total Volume M Cu. Ft.
Non-stocked	18,078	-	160	2,279	23,599
1-5	38,410	-	180	3,160	35,162
10	38,489	-	190	1,021	11,709
20	16,890	-	200	8,571	100,956
30	9,734	30,658	210	1,021	12,313
40	16,341	60,413	230	9,216	115,476
50	4,391	17,426	240	2,279	28,989
60	6,276	29,405	250	4,889	62,970
70	5,400	29,095	260	2,537	32,992
80	11,751	71,217	270	6,937	90,939
90	4,439	29,754	300	5,887	77,868
100	4,084	29,875	310	1,021	13,483
110	12,476	98,525	350	5,899	75,629
120	14,658	123,847	370	459	5,713
130	6,092	54,650	400	3,300	38,478
140	1,534	14,515	500	3,635	25,728
150	3,353	33,275			
		Total		274,506	1,374,659

Other Resource Inventories

Inventories were conducted to identify and categorize specific capability and potential of resources other than timber. A detailed soil survey for the entire Coos Bay District was published in 1977. Recreation planners applied the BLM's Recreation Information System, an inventory approach for

determining inherent potential of the land to support various recreation activities. Visual resource specialists inventoried and classified the SCCSYUs for visual and esthetic considerations. A review and compilation of known cultural resource data (Class I cultural resource inventory) has been completed. Wildlife biologists inventoried deer and elk winter range and northern spotted owl and bald eagle nest sites. Fisheries biologists conducted surveys of streams within the district. Botanical surveys for threatened and endangered plants were initiated for the Coos Bay District in September 1978 and are updated yearly.

Land Use Allocation

After identifying resources and opportunities based on inventory data, BLM resource specialists made recommendations to maximize their particular resource. These recommendations appear in the Management Framework Plan (MFP). Recommendations conflict on occasion. The identification and evaluation of these conflicts is the heart of the BLM land use allocation process. All potential conflicts and possible ways to reduce these conflicts are analyzed. Those alternatives that best resolve conflicts while maintaining maximum possible quality and quantity of all resource values involved are recommended.

The Coos Bay District utilized this capability during the conflict analysis stage of the MFP process. Numerous alternative solutions to individual conflicts were considered prior to formulating the proposed action which was circulated for public review and comment in November 1979. Land use allocations for resource values derived for MFP alternatives were adapted to the alternatives analyzed in this EIS (Table A-2). The acres discussed in this table include all of the lands in the SCCSYUs. However, the acreages discussed in the body of this EIS are generally those lands allocated to the intensive and constrained timber production bases under each alternative.

When final MFP timber management decisions are made following the final EIS, they will form the management prescriptions. Similarly, actions for other resources, e.g., habitat management plans, will be formulated within the MFP guidelines. Significant MFP recommendations, conflicts and proposed decisions affecting the timber management program are summarized in Table A-3.

Allowable Cut Computation

A computerized forest simulation model (SIMIX) is used to determine the highest sustainable allowable cut for each alternative. The clearcut option of SIMIX was utilized since clearcut is the predominant harvest method in all alternatives. For accuracy in measuring lumber and plywood production, the allowabe cut is computed and projected into the future on the basis of cubic feet.

Table A-2 Land Use Allocation Proposed For The EIS Alternatives
Including the Proposed Action In Acres

	Alternatives Including the Proposed Action (PA)				
	PA, 4,5,6 & 7	1	2	3	8
No Planned Timber Management					
Non-Forest Lands	14,219	14,219	14,219	14,219	5,337
Non-Commercial Forest Lands	4,142	4,142	4,142	4,142	46,714
Statuatory Land Withdrawals	1,749	1,749	1,749	1,749	1,749
Stream Buffers (Riparian Zones)	10,832	10,832	10,832	20,916	1,375
Watershed Protection - Fragile Sites	22,148	22,148	22,148	22,148	-0-
Communication Sites	26	-0-	-0-	26	-0-
Recreation (Proposed)	221	-0-	-0-	221	-0-
Quarry Expansion	20	-0-	-0-	20	-0-
Sub-total	53,357	53,090	53,090	63,441	55,175
Intensive Timber Management	-	-	-	-	-
Timber Production Base 1/	-	-	-	-	-
Intensive Timber	203,393	264,105	245,296	117,948	260,875
Wildlife	36,508	-0-	18,809	66,149	4,256
VRM II	4,118	-0-	-0-	24,900	2,681
VRM III	20,024	-0-	-0-	39,000	-0-
Sub-total	264,043	264,105	264,105	247,997	267,812
Other 2/					
Intensive Timber	6,969	9,177	8,954	13,896	3,385
Wildlife	276	-0-	223	1,038	-0-
VRM II	293	-0-	-0-	-0-	-0-
VRM III	1,434	-0-	-0-	-0-	-0-
Sub-total	8,972	9,177	9,177	14,934	3,385
Total District Acres	326,372	326,372	326,372	326,372	326,372

1/ Included in allowable cut computation

2/ These other lands are hardwoods and brush fields that are not included in the allowable cut computation until after conversion to coniferous plantations.

Table A-3
Significant MFP Recommendations, Conflicts and Proposed Land Use Allocations
Affecting the Timber Management Program

Multiple Use Issue	Resource Recommendations that Conflict with Timber Management	Conflicts	Proposed Allocations & Rationale	Significant Tradeoffs
I. Stream Buffers: The effects of streamside timber harvest and the application of herbicides on fishery, wildlife, watershed and recreation values.	Fisheries recommendation is to leave undisturbed the riparian zones along 391 miles of stream providing crucial fish habitat. A minimum buffer of 75 feet on each side would be left even where the actual riparian zone is narrower.	Disturbance and loss of shade resulting from timber harvest and use of herbicides beside streams would threaten stability of fish populations. Total loss of the fish populations in these streams would reduce both commercial and sport fishing, resulting in a loss of $455,000 in local personnal income annually and 20 fishery-dependent jobs compared to what would be expected if the recommended protection were applied.	On first order streams, buffer only if used for domestic water supply. On second order streams, buffer only if the stream supports fish, has a well defined riparian zone, or is a source of domestic water. On the 683 miles of third order and larger streams, maintain and protect the soil and vegetation of the riparian zone. Leave at least 75 feet on each side of the stream undisturbed. Harvest in the buffer would occur only to remove minor products such as firewood; to provide corridors not exceeding 50 feet for full log suspension system; to permit road crossings of streams or powerline expansion, to benefit recreation, fisheries, visual or cultural resources; and to salvage timber, after a catastrophic event. Herbicides will not be used in the riparian zones. Rationale: Buffer strips as proposed are necessary to provide protection to other resources despite the adverse economic impact of removing the buffers from timber harvest. Timber harvest on some 10,000 acres of riparian zones adjacent to second order streams will have only moderate impacts on wildlife, as this headwater zone provides the least important riparian habitat. On the other hand, timber harvest on these lands will add about 14 MM bd. ft. to the annual timber harvest, providing $2.7 million in local personal income annually and some 154 jobs.	The timber production base would be reduced by approximately 10,832 acres, which would result in a reduction of potential annual harvest of some 12 MM bd. ft. The economic benefits foregone would amount to approximately 132 full-time equivalent jobs and local personal income of some $2.28 million offset by the anticipated fishery benefits of 20 jobs and $455,000.
	A wildlife recommendation is to leave undisturbed the riparian zones on all second order and larger streams. A minimum buffer of 75 feet on each side of streams would be left even where the riparian zone is narrower. A watershed recommendation calls for maintenace of an undisturbed buffer on the riparian zones of all third order and larger streams plus those smaller streams supporting fish or providing domestic water. A minimum buffer of 75 feet would be left on third order and larger streams.	Many species are largely or entirely dependent on riparian zones. Disturbance of the riparian zones would result in serious depletion of the dependent wildlife population. Timber harvest in these zones would increase streambank erosion and cause degradation of water quality. Exclusion of the riparian areas from the timber production base would remove some 20,900 acres from it, reducing annual timber harvest by 26 MM bd. ft.		

Table A-3 continued

Multiple Use Issue	Resource Recommendations that Conflict with Timber Management	Conflicts	Proposed Allocations & Rationale	Significant Tradeoffs
II. Wildlife Habitat Maintenance: The effect of timber harvest on forest age class distribution and the impact of that distribution on wildlife species, especially those dependent on old-growth timber for survival.	Wildlife recommendation is to maintain or establish 15 to 30 percent of the forest in old growth (200+ years), and mid-age (120 to 200 years) stands. Not less than one-third of that acreage should be contained in blocks of 640 acres or more, with the balance in blocks of 80 acres or more.	Unrestricted timber harvest in old-growth and mid-age forests would destroy habitat of dependent species, probably eliminating many of those species from the planning area. Adopting the wildlife recommendations would remove some 56,800 acres from the intensive timber management base.	Manage a defined corridor and selected lands outside that corridor, to provide habitat diversity and gene pool preservation for wildlife species. Those selected lands that are potentially manageable for intensive timber production would be managed on a 350 year minimum harvest age to develop desired seral stages in blocks of the desired sizes. Included would be essential habitat to maintain at least 16 identified spotted owl pairs, as well as crucial elk and deer habitat (see Issue No. III). Rationale: This decision protects the economic base of the area while maintaining viable populations of most wildlife species.	Some 32,700 acres of commercial forest land within the corridor and 4,100 acres outside the corridor would be excluded from intensive timber management and managed on a 350 year minimum harvest age resulting in a reduction in potential annual harvest of some 47 MM bd. ft. The economic benefit foregone would amount to approximately 540 fulltime equivalent jobs and local personal income of $9.3 million annually. Over 50 years, the populations of old-growth dependent wildlife species in the planning area are expected to decline by some 65 - 70 percent. Mid-age habitat dependent populations would be expected to decline 60 - 65 percent. Under a worst case situation, as many as 15 old-growth dependent species could be lost within the planning area over 50 years time.

Table A-3 continued

Multiple Use Issue	Resource Recommendations that Conflict with Timber Management	Conflicts	Proposed Allocations & Rationale	Significant Tradeoffs
III. Big Game Habitat: The effects of timber harvest on distribution of habitat components.	Wildlife recommendation is to provide an appropriately balanced ratio of thermal cover, forage areas and escape cover for deer and elk in commercial timberlands. These ratios would be established on each 640 acre section of deer habitat, and on 2,000-acre units for elk habitat. This action, combined with the recommendation in Issue II, would be expected to increase deer and elk populations using public lands in the planning area from current levels of 15,000 and 2,500, respectively, to 25,000 and 4,000.	Unrestricted timber harvest could lead to a reduction in deer and elk populations to as low as 4,000 and 250, respectively. Due to constraints on timber harvest plans, the adoption of the wildlife recommendation for a 15 year spacial management of clearcuts, would reduce potential annual harvest by an estimated 58 MM bd. ft.	Use a 10-year spacial management of clearcuts, when possible, to distribute the proposed cover and forage ratios throughout the District, but not necessarily on each section or 2,000 acre unit. Rationale: This approach would maintain viable and stable populations of deer and elk at or near current levels. The anticipated gain in local personal income of several hundred thousand dollars annually from increased hunting if the wildlife recommendations were adopted entirely, would not offset the expected loss of 20 to 35 MM bd. ft. in annual harvest and associated personal annual income of $3.8 to $6.6 million.	The maximum potential big game populations in the planning area, would not be reached. Instead, these populations would remain stable or perhaps decline to some 8,000 deer and 1,500 elk, over a period of 50 years.

Table A-3 continued

Multiple Use Issue	Resource Recommendations that Conflict with Timber Management	Conflicts	Proposed Allocations & Rationale	Significant Tradeoffs
IV. Management of VRM Class II and III Lands: The harvest on lands with moderately high visual values (those proposed for inclusion in VRM Class II) and with moderate visual values (proposed for inclusion in VRM Class III).	VRM recommendation is to manage the proposed VRM Class II lands so that management activities are not visually evident from critical viewpoints and travel routes. Proposed VRM Class III lands would be managed so all management activities remain visually subordinate to the characteristic landscape from critical viewpoints and specified travel routes.	Unrestricted timber harvest and management on these lands would reduce their esthetic values. Some 24,900 acres proposed for VRM II classification and 39,000 acres proposed for VRM III classification are eligible for inclusion in the intensive timber management base. Managing the lands under the proposed VRM standards would restrict timber management and harvest, reducing annual timber production potential by 23 MM bd. ft., 15 of which are attributable to proposed Class II management.	Of the lands eligible for intensive timber management, manage 4,411 acres as VRM Class II and 21,458 acres as VRM Class III. The acres to be managed as Class II are primarily foreground zones close to well-traveled highways. Class III management would be applied to most other foreground zones identified in the VRM recommendations and Class IV (minimal constraints) to the balance, primarily middle-ground zones. Rationale: A reduction of 23 MM bd. ft. to meet VRM objectives would result in a loss of $4.4 million in local personal income annually and 252 full time equivalent jobs. Failure to harvest this timber would not affect visual quality since BLM manages less than half the land in the affected areas, in a checkerboard pattern, and management on the intermingled private lands will dictate the visual pattern in these areas regardless of BLM visual management practices.	Some loss in visual quality, particularly where clearcut patches in middleground zones would become noticeable. Potential annual timber harvest would be reduced by 7 MM bd. ft. at a cost of $1.4 million in local personal income annually and 77 full time equivalent jobs.

Intensive practices are one part of the forest simulation used in this phase. The total forest is projected into the future to reflect the effects on its productivity of planned land use, multiple use impacts and utilization practices as well as investments in intensive silvicultural practices. The projection period extends 40 decades into the future in order to fully account for effects which sometimes span several rotations. For example, in the case of final harvest cutting, several rotations are needed to move from the present to a fully regulated forest.

This lengthy projection period is not an attempt at a 400 year plan. It is used only to assure that the condition of no planned reduction in allowable cut can be met.

The model designed for forests under an even-aged system of management produces output data by decades for each age and treatment class and summarizes them numerically and graphically. These data include level of growing stock, annual growth, acreage by silvicultural practices and volume by harvesting practice. Consequently, it permits alternative plans to be evaluated on the basis of their respective production levels and fiscal requirements and serves as a basis for programming personnel and funds for the alternative selected. In effect, a management plan is developed that schedules the production from commercial thinning, mortality salvage and final harvest operations and also the acreages for such treatments as reforestation and precommercial thinning. The model is geared to the proposed policies but is flexible to the extent that other regulatory policies can be applied in its use.

Appendix B

Five-Year Timber Sale Plan

The Bureau's policy is to maintain a 5-year lead time in timber sale planning which is updated annually. This sample plan illustrates the first 5 years providing the proposed action is the selected Alternative.

Table B-1 Five-Year Timber Sale Plan and Potential Conflicts

Sale	Vol. MM bd.ft.	Road Construction (miles) New Surf.	New Unsurf.	Improved Surf.	Improved Unsurf.	Yarding Method (acres) Cable	Full Susp.	Aerial	Avg. Slope %	Homes w/in 1 mi.	Est. Burn (Ac)	Major Soils	Potential Conflicts and Impacts: Sale Unit	Rec. & Cult.	Fish & Wildlife	Soils
Fiscal Year 1982																
82-01	4.0	.19	-	-	-	69	-	-	52	-	69	64-R-66	1	F	LQ	UW
													2	F		U
82-02	3.1	.27	-	2.27	-	71	-	-	56	-	71	66-64	1		K(54)	UW
													2			U
82-03	7.0	.21	-	.93	-	101	-	-	60-75	-	101	64-66	1	B	K(46)R	
													2		K(55)R	UW
82-04	3.1	.33	.09	.49	.23	46	-	-	10-48	-	46	66-64	1			
													2			UW
82-05	4.3	.72	-	-	-	62	-	-	41	-	62	63-57	1	E	K(62)R	
82-06	6.0	.45	-	-	-	99	-	-	42-50	4	99	64-R	1			U
													2	ADGI		UW
82-07	3.1	.13	-	-	-	56	-	-	60	-	56	64-R	1		K(56)	UW
82-08	6.9	.21	-	.28	-	102	-	-	25-60	-	102	64-63-57	1			
													2			
													3			
													4			U
82-09	3.3	.06	-	-	-	47	-	-	60	-	47	64-R-63	1		K(47)L	UW
82-10	6.3	1.75	-	2.08	-	84	-	-	29-35	-	84	63-57	1	E		
													2	EG	K(46)R	UW
82-11	7.1	.44	-	-	-	97	-	-	45-65	-	97	63-64-57	1		K(45)R	
													2	B	K(52)R	
82-12	3.0	1.04	-	1.52	-	74	-	-	40-70	5	74	66-64-50	1			UW
													2	S		UVW
													3			UW
82-13	6.0	.71	-	-	-	78	64	-	40-70	2	142	66-50-64	1			UVW
													2			U
													3			UVW
													4		L	U
													5		LRT	U
82-14	5.7	.34	-	1.80	-	94	-	-	30-65	21	94	63-64	1	BGHI	T	
													2	BEGH	T	
													3	BEFGHI	T	
82-15	9.1	.32	-	1.61	-	154	-	-	25-60	-	154	57-63	1	B	LNT	
													2	B	LNT	
													3	B	LNT	
													4	B	LNT	
													5	B	K(46)	
82-16	5.7	.57	-	.66	-	67	-	-	65-70	-	67	63-64-R	1		QT	
													2		T	
82-17	3.4	.83	-	-	-	91	-	-	25-40	41	91	63-64-57	1	EGH		
													2	E	T	
													3	EGH		
82-18	2.7	.21	-	.28	-	39	-	-	65	-	39	63-64-R	1	BE	L	
82-19	4.1	.72	-	1.23	-	56	26	-	45-65	-	82	63-64	1			
													2		QT	
													3		T	
82-20	5.3	-	-	-	-	-	-	63	60-65	-	63	564-R-57	1	B	LNT	
													2	B	LNT	U
82-21	5.2	.25	-	.38	-	9	64	-	30-70	-	73	63-64-57	1	B		
													2	B	PQT	
													3	B	Q	
82-22	3.7	-	-	-	-	43	-	-	40-50	-	43	63-64-R	1	B		
													2	B	L	
82-23	9.4	.15	-	.23	-	26	115	-	45-70	-	141	63-57	1	E	PT	
													2	BE	K(65)LQ	
													3	E		
82-24	5.8	.40	-	-	-	-	74	-	50-70	-	74	63-64-R	1		OT	
													2		L	UVW
82-25	3.9	.70	-	-	-	75	-	-	30-50	4	75	57-63	1	AG		
													2		L	
82-26	3.9	.76	-	-	-	-	-	78	60-80	-	78	63-64-R	1			
													2	B		
82-27	4.6	.44	-	-	-	62	-	-	30-50	3	62	66-64-57	1		L	
													2		L	
82-28	7.0	-	-	.57	-	163	-	-	35-59	-	163	57-66-10	1			
													2	G	L	
													3		L	
													4			
													5		L	
82-29	7.9	2.04	-	1.80	-	175	-	-	10-59	-	175	10-57	1	G	Q	
													2	G		
													3	G	T	
													4	G	T	
													5	G		
82-30	8.9	1.30	-	-	-	161	-	-	10-59	2	161	66-501	1	BG		
													2	G		
													3		T	
													4	G	K(45)	U

IMPACT KEY

Recreation and Cultural

A w/in 1 mile of a developed recreation site
B w/in 1 mile of a specific sightseeing area
C w/in 1 mile of a planned recreation management opportunity
D w/in 1 mile of an archeologic site
E w/in 1 mile of a historic site
F w/in an identified ecologically significant area
G w/in the foreground-middleground visual distance zone
H w/in an area of high user interest and concern for visual resources
I w/in a highly scenic unit

Fish and Wildlife

J Spotted owls pairs included in management plan
K Clearcut in excess of 40 acres (total acres)
L 10-year spacing of clearcut
M Key old-growth within corridor
N Other Spotted Owl conflicts
O Identified potential bald eagle areas
P Key big game cover
Q Clearcut adjacent to stream with coldwater resident fish values
R Clearcut adjacent to stream with coldwater resident and anadromous fish values
S New road crossing stream with known fish values
T Conflict with Alt. 3 Ecoblock

Soils

U Sale on identified problem soil
V Stream crossing on fragile and/or unstable soil
W Roads built on fragile soils
X Roads built on unstable (Whobrey) soils

Table B-1 Five-Year Timber Sale Plan and Potential Conflicts

Sale	Vol. MM bd.ft.	Road Construction (miles) New Surf.	New Unsurf.	Improved Surf.	Improved Unsurf.	Yarding Method (acres) Cable	Full Susp.	Aerial	Avg. Slope %	Homes w/in 1 mi.	Est. Burn (Ac)	Major Soils	Potential Conflicts and Impacts: Sale Unit	Rec. & Cult.	Fish & Wildlife	Soils
Fiscal Year 1982																
82-31	1.0	1.64	-	1.99	-	40	-	-	10-59	-	40	580	1			
													2	GH		
82-32	8.1	1.14	-	.19	-	236	-	-	10-59	6	236	540-530	1			
													2	G	T	
													3	G	T	
													4	G	K(44)	
													5	G		
													6	DI		
82-33	4.9	-	-	-	-	83	-	-	10-59	-	83	57-66	1	EF	MNT	
													2	EF	K(49)MNT	
82-34	4.9	.57	-	-	-	55	-	-	10-59	-	55	57-66	1		T	
													2		T	
82-35	3.3	-	-	-	-	62	-	-	10-59	-	62	10	1	G		
													2			
82-36	7.9	1.28	-	-	-	172	-	-	10-59	1	172	10-66-57	1			
													2			
													3		R	
													4		LR	
													5		L	
82-37	5.0	1.80	-	.70	-	91	-	-	10-59	-	91	63-57	1		T	
													2			
													3			
													4			
82-38	4.3	1.52	-	-	-	86	-	-	35-59	-	86	63-57	1		K(46)	
													2			
82-39	6.4	-	-	3.37	-	144	-	-	10-59	-	144	57-63	1		R	
													2		L	
													3			
													4		L	
82-40	4.6	.52	-	-	-	104	-	-	10-59	-	104	564-66	1		R	
													2		L	
													3			
82-41	6.4	-	-	2.37	-	91	52	-	10-34	-	143	57-66	1		K(43)MQ	
													2		Q	
													3			
													4		Q	
Fiscal Year 1983																
83-1	4.5	-	-	.09	-	68	-	-	55-65	-	68	64-R-66	1	F	L	U
													2	F		U
83-2	4.2	.36	-	.63	-	77	-	-	40	2	77	64-R-66	1	AEG		UW
													2	AEG		UW
83-3	2.8	.47	-	-	-	46	-	-	50-55	-	46	64-R-63	1	F		
													2	F	Q	
83-4	3.8	.44	-	-	-	66	-	-	33-65	-	66	64-66	1			UW
													2			UW
83-5	6.1	.52	-	-	-	112	-	-	28-50	20	112	57-54-63	1	GH	K(66)	
													2	GH	K(68)	
83-6	5.2	.90	-	-	-	78	-	-	50-60	-	78	63-64	1			
													2			
													3			
83-7	5.6	.13	-	1.14	-	80	-	-	52-65	-	80	64-R	1			
													2		Q	UW
													3		Q	U
83-8	6.2	.76	-	.25	-	83	-	-	45-55	-	83	64-63-R	1		L	
													2			
													3			
83-9	7.4	.15	-	.53	-	87	-	-	55-67	-	87	64-R-63	1			UW
													2		K(65)	U
83-10	7.6	-	-	-	-	50	-	54	45-60	-	104	63-64-57	1	BE	K(50)R	
													2	BE	K(54)R	
83-11	4.0	-	-	-	-	80	-	-	40-60	10	80	63-64-57	1	GH		
													2			
													3			
													4			
													5			
83-12	7.5	-	-	1.14	-	-	-	1.72	40-80	-	172	63-R-64	1	BGH	T	
													2	BGH	T	
													3	GH	K(64)T	
													4	GH	T	
													5	GH	T	
83-13	4.0	.95	-	4.64	-	88	-	-	35-65	-	88	63-57	1			
													2			
													3			
													4			
													5			

IMPACT KEY

Recreation and Cultural
- A w/in 1 mile of a developed recreation site
- B w/in 1 mile of a specific sightseeing area
- C w/in 1 mile of a planned recreation management opportunity
- D w/in 1 mile of an archeologic site
- E w/in 1 mile of a historic site
- F w/in an identified ecologically significant area
- G w/in the foreground-middleground visual distance zone
- H w/in an area of high user interest and concern for visual resources
- I w/in a highly scenic unit

Fish and Wildlife
- J Spotted owls pairs included in management plan
- K Clearcut in excess of 40 acres (total acres)
- L 10-year spacing of clearcut
- M Key old-growth within corridor
- N Other Spotted Owl conflicts
- O Identified potential bald eagle areas
- P Key big game cover
- Q Clearcut adjacent to stream with coldwater resident fish values
- R Clearcut adjacent to stream with coldwater resident and anadromous fish values
- S New road crossing stream with known fish values
- T Conflict with Alt. 3 Ecoblock

Soils
- U Sale on identified problem soil
- V Stream crossing on fragile and/or unstable soil
- W Roads built on fragile soils
- X Roads built on unstable (Whobrey) soils

Table B-1 Five-Year Timber Sale Plan and Potential Conflicts

Sale	Vol. MM bd.ft.	Road Construction (miles) New Surf.	New Unsurf.	Improved Surf.	Improved Unsurf.	Yarding Method (acres) Cable	Full Susp.	Aerial	Avg. Slope %	Homes w/in 1 mi.	Est. Burn (Ac)	Major Soils	Potential Conflicts and Impacts Sale Unit	Rec. & Cult.	Fish & Wildlife	Soils
83-14	7.6	.19	-	.38	-	78	22	-	18-55	-	100	57-63-66	1	F		
													2	FGH		
													3	FGH		
													4	F	L	
83-15	4.6	.42	-	-	-	-	56	-	40-75	-	56	57-63-64	1			
													2			
83-16	2.3	.59	-	-	-	41	-	-	20-55	-	41	57-63	1	B	L	
													2	BE	L	
83-17	2.8	-	-	-	-	52	-	-	35-65	-	52	63-57	1	B	L	
													2	B	L	
													3	B	L	
83-18	4.3	.47	-	2.46	-	-	80	-	35-55	-	80	63-64-R	1		T	
													2		QT	
													3		QT	
83-19	3.6	-	-	.28	-	11	38	-	20-45	-	49	63-64	1	B	L	
													2	B		
83-20	3.3	.14	-	-	-	-	43	-	45-50	-	43	63-64-R	1	B	Q	
													2	B	LPT	
83-21	5.1	.11	-	.38	-	56	-	-	40-45	-	56	63-64-R	1	B	L	
													2	B	L	
83-22	4.2	1.04	-	-	-	120	-	-	50-60	15	120	57-63-10	1	CE	T	
													2	BCEG	T	
													3	CEG	R	
83-23	4.8	-	-	3.66	-	40	53	-	40-60	1	93	57-63	1		LR	
													2	F	K(55)R	
83-24	2.0	.11	-	-	-	43	-	-	30-40	17	43	20-14	1	EG	LO	
													2	EG	LOPT	
83-25	6.9	.13	-	-	-	-	115	-	50-70	-	115	57-63-64	1	ACE	L	
													2	ACE	K(75)L	
83-26	5.3	1.33	-	-	-	-	94	-	50-70	-	94	63-57	1	E	K(61)	
													2		L	
83-27	4.5	.28	-	-	-	54	14	-	20-40	12	68	57-66-10	1	G	LPT	
													2	G	LPT	
													3	E	L	
83-28	4.1	-	-	-	-	-	-	58	50-70	-	58	63-57	1	E	K(58)Q	
83-29	4.9	-	-	2.06	-	42	54	-	10-59	-	96	57-66-63	1		L	
													2		K(54)	
83-30	4.7	.25	-	-	-	102	-	-	35-60	1	102	66-64-57	1	GH		U
													2			U
													3	EGH	T	
83-31	6.9	-	-	-	-	-	-	117	10-59	-	117	501-66	1		QT	U
													2		Q	
													3			U
83-32	2.3	.08	-	-	-	50	-	-	10-59	14	50	10	1	G	RT	
													2	G	R	
83-33	1.7	.62	-	-	-	29	-	-	35-59	3	29	10-57	1	BEGH	T	
													2	BEGH	T	
83-34	1.7	.35	-	1.14	-	29	-	-	10-34	5	29	501-557	1	BE		UX
83-35	4.1	.68	-	-	-	72	-	-	10-59	-	72	57-10	1			
													2			
83-36	5.9	.54	-	-	-	94	-	-	35-59	-	94	501-66	1	H		UX
													2	E	T	UW
													3			UWX
83-37	6.8	.35	-	-	-	136	-	-	10-59	-	136	10-63	1			
													2		T	
													3		PT	
													4		K(43)	
83-38	8.1	1.74	-	-	-	136	-	-	10-59	3	136	501-557	1			UX
													2			UX
													3			UX
													4			
83-39	3.4	.52	-	.57	-	67	-	-	10-59	-	67	10-57	1		T	
													2			

IMPACT KEY

Recreation and Cultural

A w/in 1 mile of a developed recreation site
B w/in 1 mile of a specific sightseeing area
C w/in 1 mile of a planned recreation management opportunity
D w/in 1 mile of an archeologic site
E w/in 1 mile of a historic site
F w/in an identified ecologically significant area
G w/in the foreground-middleground visual distance zone
H w/in an area of high user interest and concern for visual resources
I w/in a highly scenic unit

Fish and Wildlife

J Spotted owls pairs included in management plan
K Clearcut in excess of 40 acres (total acres)
L 10-year spacing of clearcut
M Key old-growth within corridor
N Other Spotted Owl conflicts
O Identified potential bald eagle areas
P Key big game cover
Q Clearcut adjacent to stream with coldwater resident fish values
R Clearcut adjacent to stream with coldwater resident and anadromous fish values
S New road crossing stream with known fish values
T Conflict with Alt. 3 Ecoblock

Soils

U Sale on identified problem soil
V Stream crossing on fragile and/or unstable soil
W Roads built on fragile soils
X Roads built on unstable (Whobrey) soils

Table B-1 Five-Year Timber Sale Plan and Potential Conflicts

Sale	Vol. MM bd.ft.	Road Construction (miles) New Surf.	New Unsurf.	Improved Surf.	Improved Unsurf.	Yarding Method (acres) Cable	Full Susp.	Aerial	Avg. Slope %	Homes w/in 1 mi.	Est. Burn (Ac)	Major Soils	Potential Conflicts and Impacts: Sale Unit	Rec. & Cult.	Fish & Wildlife	Soils
83-40	7.0	1.89	-	.57	-	252	-	-	10-60	3	252	524-530	1	DG	T	
													2	G		
													3	G		
													4	G		
													5			
													6			
													7		T	
													8	GH	R	
83-41	3.6	-	-	-	-	78	-	-	10-59	13	78	57-66	1	BDEG		
													2	BDEG	R	
													3	BDEG	T	
83-42	7.1	.45	-	.42	-	151	-	-	10-59	-	151	57-63	1	G	L	
													2		R	
													3		L	
													4			
83-43	5.3	.71	-	2.08	-	68	-	-	10-59	-	68	57-63	1		R	
													2			
83-44	3.3	.57	-	-	-	21	59	-	10-59	3	80	66-57	1	BEGH		
													2	BEGH		
													3	BEGH		
83-45	7.5	.43	-	.23	-	165	-	-	10-60	1	165	57-10	1	BEGH	R	
													2		K(44)T	
													3	E		
													4	E		
Fiscal Year 1984																
84-1	3.9	-	.13	-	-	69	-	-	40-55	-	69	64-R-66	1	F	Q	U
													2	F		
84-2	5.8	1.42	-	.49	-	94	-	-	40-50	-	94	63-64	1	B	R	
													2	B	R	
													3	B		UW
84-3	3.6	-	-	-	-	-	-	65	45-60	7	65	64-R-66	1	G		U
													2	G	K(47)	U
84-4	1.7	.13	-	.40	-	26	-	-	40	-	26	64-66-14	1		R	
84-5	5.5	.09	-	.42	-	93	-	-	30-38	-	93	57-66	1	GH		
													2	GH		
													3			
84-6	2.2	-	-	-	-	34	-	-	75	3	34	64-R-63	1			U
84-7	3.4	.23	-	-	-	105	-	-	28-33	-	105	63-64	1		R	
													2		K(55)R	
													3		L	
84-8	6.0	.27	-	.51	-	88	-	-	20-43	-	88	63-64-57	1			
													2			
84-9	6.8	.32	-	.93	-	91	-	-	60-70	-	91	63-64-57	1	BE		
													2	BE		
													3	BE	K(59)	
84-10	9.3	.08	-	-	-	134	-	-	45-50	-	134	63-64-57	1	I	K(61)PT	
													2		K(52)	
													3		T	
84-11	8.3	1.08	-	.06	-	150	-	-	25-50	3	150	57-63	1			
													2			
													3			
													4		LR	
													5			
													6		R	
84-12	6.2	.55	-	2.08	-	-	-	170	40-70	6	170	66-50-64	1		L	U
													2			U
													3			U
													4	GH		U
													5	GH		U
													6	GH		U
													7		L	U
													8	GH		
													9	GH		
84-13	3.1	1.33	-	-	-	34	46	-	50-65	2	80	63-64-57	1	GH	K(46)	
													2			

IMPACT KEY

Recreation and Cultural
- A w/in 1 mile of a developed recreation site
- B w/in 1 mile of a specific sightseeing area
- C w/in 1 mile of a planned recreation management opportunity
- D w/in 1 mile of an archeologic site
- E w/in 1 mile of a historic site
- F w/in an identified ecologically significant area
- G w/in the foreground-middleground visual distance zone
- H w/in an area of high user interest and concern for visual resources
- I w/in a highly scenic unit

Fish and Wildlife
- J Spotted owls pairs included in management plan
- K Clearcut in excess of 40 acres (total acres)
- L 10-year spacing of clearcut
- M Key old-growth within corridor
- N Other Spotted Owl conflicts
- O Identified potential bald eagle areas
- P Key big game cover
- Q Clearcut adjacent to stream with coldwater resident fish values
- R Clearcut adjacent to stream with coldwater resident and anadromous fish values
- S New road crossing stream with known fish values
- T Conflict with Alt. 3 Ecoblock

Soils
- U Sale on identified problem soil
- V Stream crossing on fragile and/or unstable soil
- W Roads built on fragile soils
- X Roads built on unstable (Whobrey) soils

Table B-1 Five-Year Timber Sale Plan and Potential Conflicts

Sale	Vol. MM bd.ft.	Road Construction (miles) New Surf.	New Unsurf.	Improved Surf.	Improved Unsurf.	Yarding Method (acres) Cable	Full Susp.	Aerial	Avg. Slope %	Homes w/in 1 mi.	Est. Burn (Ac)	Major Soils	Potential Conflicts and Impacts: Sale Unit	Rec. & Cult.	Fish & Wildlife	Soils
84-14	6.9	-	-	-	-	68	22	-	45-70	-	90	63-64-57	1	B		
													2	B	NT	
													3	B	NT	
													4	B	NT	
													5	B	LNT	
84-15	2.0	.91	-	-	-	73	-	-	40-65	13	73	63-64-57	1	F		
													2	F		
													3	F	Q	
84-16	4.7	.87	-	-	-	-	-	67	50-55	-	67	64-R	1		T	
													2			
84-17	8.0	-	-	1.89	-	93	-	-	45-55	-	93	63-64-57	1		L	
													2		L	
													3		L	
84-18	6.9	.08	-	-	-	25	46	-	25-75	-	71	63-64-R	1	B		
													2	B		
													3	B	Q	
84-19	3.5	.57	-	-	-	76	-	-	50-65	9	76	57-63-10	1	E		
													2	E		
													3	E	L	
													4	E		
84-20	3.2	.49	-	1.42	-	-	51	-	40-65	-	51	63-64	1	BE	L	
													2	BE		
84-21	2.4	.63	-	-	-	52	-	-	60-65	-	52	64-R	1		L	U
													2		L	UW
84-22	6.4	.23	-	-	-	31	38	-	35-60	-	69	64-57	1		L	U
													2			
													3		LQS	
84-23	3.9	1.39	-	-	-	108	-	-	25-45	9	108	14-20	1	CEG	QT	
													2	EG	K(65)	
84-24	2.1	.47	-	-	-	45	-	-	20-50	-	45	10-57	1		LPT	
													2		L	
84-25	3.2	-	-	-	-	-	-	53	40-50	-	53	57-63	1	E	K(53)MNP	
84-26	3.9	.15	-	-	-	38	31	-	35-60	-	69	63-57	1	C	M	
													2	C	T	
84-27	7.3	.15	-	-	-	-	-	104	60-80	-	104	64-R	1	BCE	K(51)	UW
													2	CE	K(53)	U
84-28	9.4	1.06	-	.72	-	166	-	-	35-59	6	166	57-66-64	1	G	Q	
													2	G		
													3	G		
													4	G		
													5	G		
													6	G	PT	UW
84-29	6.3	1.93	-	.19	-	145	-	-	10-59	1	145	10-57	1	G		
													2			
													3		K(45)	
													4		R	
84-30	6.3	1.04	-	-	-	109	-	-	35-59	1	109	57-66	1			
													2		R	
													3			
84-31	6.0	-	-	-	-	-	-	100	60	1	100	66-57	1	G	K(50)L	U
													2	G		
84-32	5.0	.57	-	.97	-	113	-	-	10-59	-	113	57-64	1		Q	
													2			
													3			
84-33	3.7	-	-	.57	-	85	-	-	10-59	-	85	10-57	1	G		
													2			
													3			
84-34	6.4	.34	-	-	-	126	-	-	10-34	2	126	10-57	1	G		
													2	G		
													3	G	K(44)	
84-35	4.7	.72	-	.38	-	118	-	-	10-59	-	118	57-10	1	G	T	
													2			
													3	G		
84-36	7.2	2.27	-	-	-	116	-	-	10-59	-	116	57-10-66	1	BEG	L	
													2			
													3		T	
84-37	5.2	-	-	.95	-	127	-	-	10-59	-	127	10-57	1	G	T	
													2		T	
													3			
													4			
84-38	5.7	.89	-	-	-	116	-	-	10-60	10	116	57-10	1			
													2	G	T	
													3	EG	T	
													4	EG	T	

IMPACT KEY

Recreation and Cultural

A w/in 1 mile of a developed recreation site
B w/in 1 mile of a specific sightseeing area
C w/in 1 mile of a planned recreation management opportunity
D w/in 1 mile of an archeologic site
E w/in 1 mile of a historic site
F w/in an identified ecologically significant area
G w/in the foreground-middleground visual distance zone
H w/in an area of high user interest and concern for visual resources
I w/in a highly scenic unit

Fish and Wildlife

J Spotted owls pairs included in management plan
K Clearcut in excess of 40 acres (total acres)
L 10-year spacing of clearcut
M Key old-growth within corridor
N Other Spotted Owl conflicts
O Identified potential bald eagle areas
P Key big game cover
Q Clearcut adjacent to stream with coldwater resident fish values
R Clearcut adjacent to stream with coldwater resident and anadromous fish values
S New road crossing stream with known fish values
T Conflict with Alt. 3 Ecoblock

Soils

U Sale on identified problem soil
V Stream crossing on fragile and/or unstable soil
W Roads built on fragile soils
X Roads built on unstable (Whobrey) soils

Table B-1 Five-Year Timber Sale Plan and Potential Conflicts

Sale	Vol. MM bd.ft.	Road Construction (miles) New Surf.	New Unsurf.	Improved Surf.	Improved Unsurf.	Yarding Method (acres) Cable	Full Susp.	Aerial	Avg. Slope %	Homes w/in 1 mi.	Est. Burn (Ac)	Major Soils	Potential Conflicts and Impacts Sale Unit	Rec. & Cult.	Fish & Wildlife	Soils
84-39	5.4	1.04	-	-	-	107	-	-	10-59	-	107	57-10	1			
													2		L	
													3			
84-40	3.1	.27	-	4.17	-	140	-	-	10-59	-	140	530-524	1			
													2			
													3	G	Q	
													4	G		
84-41	3.2	.99	-	2.52	-	150	-	-	10-59	1	150	540-530	1		L	
													2			
													3		L	
													4			
84-42	4.5	.76	-	-	-	75	-	-	10-34	3	75	501-557	1	D		UX
													2	D		UX
							Fiscal Year 1985									
B5-1	5.5	.41	.08	-	-	99	-	-	25-55	1	99	64-R-66	1	AEG	R	UW
													2	AEG		UW
													3	AEG		UW
85-2	3.8	.17	-	-	-	64	-	-	57-65	-	64	64-R-57	1	F		
													2	F	L	UW
85-3	3.1	.43	.19	-	-	49	-	-	27-38	-	49	57-10	1	BEF	R	
													2	BEF	Q	
85-4	2.3	.74	-	.61	-	67	-	-	35-60	-	67	63-57	1	BE		
													2	BE		
85-5	6.6	-	1.87	-	1.74	106	-	-	55-65	3	106	64-66	1		K(58)	UW
													2		K(48)	UW
85-6	5.0	.66	-	.28	-	66	-	-	50-60	-	66	64-R-63	1		Q	UW
													2		Q	UW
													3			U
85-7	4.1	.25	-	.70	-	55	-	-	50-60	-	55	63-64	1	B		
													2	B	R	
85-8	3.6	-	-	.09	-	47	-	-	50-60	-	47	63-64	1		Q	
													2	B	R	
85-9	5.0	.45	-	.42	-	71	-	-	52-63	-	71	64-R-63	1			UW
													2		Q	UW
85-10	8.3	.30	-	-	-	127	-	-	52	-	127	64-63	1	BI		
													2	I	K(50)	
85-11	6.0	1.23	-	.38	-	85	-	-	40-55	-	85	64-63	1			
													2			
													3			
85-12	5.2	.08	-	-	-	64	-	-	30-60	9	64	64-R	1			U
													2			
													3			U
													4		L	UW
85-13	7.6	.45	-	.95	-	136	-	-	25-30	-	136	57-66-50	1		L	
													2		L	
													3		L	
													4		L	
													5			
85-14	7.8	-	-	.38	-	110	-	-	20-45	-	110	57-10-63	1	B	L	
													2	B	L	
													3	B		
													4	B		
B5-15	4.3	-	-	-	-	66	-	-	17-23	-	66	57-63	1	B	LNT	
													2	B	LNT	
B5-16	4.1	.30	-	.28	-	89	-	-	40-50	40	89	63-64-57	1	E	T	
													2	E		
													3	E		
85-17	7.1	2.08	-	1.14	-	120	-	-	35-65	-	120	63-64-R	1			
													2			
													3		RS	
													4		T	
85-18	3.7	.15	-	-	-	40	-	-	20-65	-	40	57-66	1	B		
													2	B		
85-19	5.2	.47	-	-	-	100	-	-	40-60	24	100	10-57	1	CG	L	
													2	CEG	L	
													3	CEG	K(46)	

IMPACT KEY

Recreation and Cultural
- A w/in 1 mile of a developed recreation site
- B w/in 1 mile of a specific sightseeing area
- C w/in 1 mile of a planned recreation management opportunity
- D w/in 1 mile of an archeologic site
- E w/in 1 mile of a historic site
- F w/in an identified ecologically significant area
- G w/in the foreground-middleground visual distance zone
- H w/in an area of high user interest and concern for visual resources
- I w/in a highly scenic unit

Fish and Wildlife
- J Spotted owls pairs included in management plan
- K Clearcut in excess of 40 acres (total acres)
- L 10-year spacing of clearcut
- M Key old-growth within corridor
- N Other Spotted Owl conflicts
- O Identified potential bald eagle areas
- P Key big game cover
- Q Clearcut adjacent to stream with coldwater resident fish values
- R Clearcut adjacent to stream with coldwater resident and anadromous fish values
- S New road crossing stream with known fish values
- T Conflict with Alt. 3 Ecoblock

Soils
- U Sale on identified problem soil
- V Stream crossing on fragile and/or unstable soil
- W Roads built on fragile soils
- X Roads built on unstable (Whobrey) soils

Table B-1 Five-Year Timber Sale Plan and Potential Conflicts

Sale	Vol. MM bd.ft.	Road Construction (miles) New Surf.	New Unsurf.	Improved Surf.	Improved Unsurf.	Yarding Method (acres) Cable	Full Susp.	Aerial	Avg. Slope %	Homes w/in 1 mi.	Est. Burn (Ac)	Major Soils	Potential Conflicts and Impacts: Sale Unit	Rec. & Cult.	Fish & Wildlife	Soils
85-20	4.1	-	-	-	-	1	-	56	30-55	-	57	57-63	1	B		
													2	B		
													3	B		
85-21	4.4	.54	-	-	-	74	-	-	40-45	-	74	57-10	1		PT	
													2		PT	
85-22	2.0	-	-	-	-	45	-	-	10-20	15	45	57-10-63	1	ADGH		
													2	ABDGH		
85-23	7.0	.40	-	-	-	51	34	-	35-60	-	85	57-64-R	1		PT	
													2			
													3		L	U
85-24	7.8	-	-	-	-	-	-	103	60-80	-	103	63-57	1	B	K(49)PT	
													2	B	K(54)L	
85-25	4.1	.09	-	-	-	61	-	-	35-60	7	61	63-57	1		NT	
													2		NT	
													3		LT	
85-26	4.2	.28	-	-	-	-	64	-	60-80	-	64	63-64-R	1		K(64)M	
85-27	4.4	.61	-	-	-	71	10	-	25-50	-	81	57-10	1	B	L	
													2	ABE		
													3	ABE		
85-28	2.1	.33	-	1.86	-	49	32	-	10-60	-	81	66-64-57	1	I		UW
													2			
													3			
85-29	4.0	.27	-	-	-	84	-	-	10-59	-	84	501-557	1	G	T	U
													2	G	T	UX
													3	HI	R	UX
85-30	10.4	2.75	-	-	-	213	-	-	35-59	-	213	57-10	1			
													2			
													3			
													4			
													5		K(45)	
													6			
85-31	5.1	.09	-	-	-	92	-	-	10-59	-	92	57-63	1	G		
													2	G		
													3			
85-32	5.7	.76	-	-	-	124	-	-	10-59	7	124	10-57	1		R	
													2			
													3			
													4		L	
85-33	4.6	.99	-	-	-	100	-	-	0-34	11	100	10-57-1	1	BEG		
													2			
													3			
85-34	2.0	.19	-	-	-	40	-	-	10-34	-	40	580	1			
85-35	8.1	.23	-	-	-	141	-	-	10-59	-	141	57-66-10	1		T	
													2			
													3			
													4		L	
85-36	8.1	.17	-	.42	-	152	-	-	35-60	-	152	66-57-64	1		L	
													2			
													3			U
													4		L	
													5			
85-37	3.5	.34	-	.28	-	78	-	-	10-60	-	78	66-64	1			
													2			UW
85-38	4.8	.38	-	-	-	80	-	-	60	5	80	57-63	1			
85-39	4.4	.25	-	-	-	103	-	-	35-59	1	103	63-57	1	G		
													2			
													3		T	
85-40	6.0	.45	-	-	-	115	-	-	10-59	-	115	57-63	1		LR	
													2		PT	
													3		PT	
													4		L	
85-41	3.3	.47	-	-	-	62	-	-	10-34	-	62	10-57	1			
													2			
85-42	1.8	.45	-	.76	-	44	-	-	10-59	-	44	10-57-66	1			
													2			
85-43	6.5	.38	-	-	-	111	-	-	10-59	-	111	57-10-63	1	E		
													2	BE	MN	
													3	BE		
													4	BE		

IMPACT KEY

Recreation and Cultural
- A w/in 1 mile of a developed recreation site
- B w/in 1 mile of a specific sightseeing area
- C w/in 1 mile of a planned recreation management opportunity
- D w/in 1 mile of an archeologic site
- E w/in 1 mile of a historic site
- F w/in an identified ecologically significant area
- G w/in the foreground-middleground visual distance zone
- H w/in an area of high user interest and concern for visual resources
- I w/in a highly scenic unit

Fish and Wildlife
- J Spotted owls pairs included in management plan
- K Clearcut in excess of 40 acres (total acres)
- L 10-year spacing of clearcut
- M Key old-growth within corridor
- N Other Spotted Owl conflicts
- O Identified potential bald eagle areas
- P Key big game cover
- Q Clearcut adjacent to stream with coldwater resident fish values
- R Clearcut adjacent to stream with coldwater resident and anadromous fish values
- S New road crossing stream with known fish values
- T Conflict with Alt. 3 Ecoblock

Soils
- U Sale on identified problem soil
- V Stream crossing on fragile and/or unstable soil
- W Roads built on fragile soils
- X Roads built on unstable (Whobrey) soils

Table B-1 Five-Year Timber Sale Plan and Potential Conflicts

Sale	Vol. MM bd.ft.	Road Construction (miles) New Surf.	New Unsurf.	Improved Surf.	Improved Unsurf.	Yarding Method (acres) Cable	Full Susp.	Aerial	Avg. Slope %	Homes w/in 1 mi.	Est. Burn (Ac)	Major Soils	Sale Unit	Potential Conflicts and Impacts: Rec. & Cult.	Fish & Wildlife	Soils
							Fiscal Year 1986									
86-1	2.6	-	-	-	2.58	58	-	-	28	48	58	57-10	1	EGH	K(58)R	
86-2	3.0	.15	-	-	-	60	-	-	50	-	60	57-63	1		K(60)T	
86-3	5.2	.34	-	.36	-	73	-	-	30-60	-	73	64-57-63	1	A	Q	
													2	AF		UW
86-4	5.6	.66	-	.98	.23	102	-	-	15-45	36	102	57-10	1		R	
													2	E		
													3	E		
86-5	3.2	.36	-	-	-	64	-	-	51	2	64	64-R-66	1			UW
													2		K(47)T	U
86-6	3.0	.40	-	.21	-	52	-	-	45-70	-	52	64-63	1	BEG	R	
													2	BEG	R	UW
86-7	4.0	.34	-	-	-	65	-	-	72-80	-	65	64-R-63	1		R	UW
													2		RT	US
86-8	4.2	1.17	-	-	-	67	-	-	38-50	-	67	63-74	1		K(47)	
													2			
86-9	7.0	-	1.08	-	2.03	140	-	-	42-45	4	140	63-57-64	1			
													2			
86-10	4.1	-	-	.66	-	48	-	-	49	-	48	63-64	1		LT	
86-11	7.0	-	-	.45	-	77	-	-	55-62	-	77	63-64	1			
													2			
86-12	4.5	1.06	-	-	-	68	-	-	42-55	-	68	64-63-R	1			
													2	BI		
													3	BI		
86-13	4.6	.66	-	.57	-	56	-	-	60-65	2	56	57-63	1	BF		
													2	B		
													3	B	L	
86-14	8.3	4.02	-	-	-	169	14	-	10-70	45	183	63-57-64	1			
													2			
													3			
													4			
													5			
													6	GH		
													7	DEGHI	OT	
													8	DEGHI	O	
86-15	4.0	-	-	.76	-	62	-	-	30-60	-	62	63-64-57	1	B	NQT	
													2	B	NT	
													3	B	NT	
													4	B	NT	
86-16	6.9	.17	-	.76	-	30	74	-	30-65	7	104	63-57-R	1	B	R	
													2	B		
													3	B		
86-17	5.2	.81	-	-	-	-	91	-	65-75	-	91	63-64-R	1		L	
													2		Q	
													3		L	
86-18	6.4	.17	-	-	-	75	-	-	35-50	-	75	57-63-10	1	BE		
													2	BE	L	
													3	BE	R	
													4	BE	LR	
86-19	4.3	.11	-	-	-	59	-	-	50-60	-	59	57-63-64	1		T	
													2		PT	
86-20	6.1	-	-	-	-	-	-	72	60	-	72	564-63	1	B	L	
													2	B	NT	U
86-21	8.8	-	-	-	-	-	118	-	40-55	-	118	63-64-R	1	B	Q	
													2	B	Q	U
													3	B	L	
													4	B	LPQT	
86-22	4.5	.15	-	-	-	50	10	-	50	-	60	63-64-57	1	BEG	PT	
													2	EF		
86-23	2.6	-	-	-	-	-	46	-	35-60	-	46	63-64-R	1	E		
													2	E		
86-24	5.6	.15	-	-	-	62	2	-	35-60	-	64	57-63	1	F		
													2	F	J	
													3	F		
86-25	1.4	.04	-	-	-	32	-	-	25-45	7	32	14-20	1	G		
86-26	4.1	.91	-	-	-	-	60	-	35-60	-	60	63-64-R	1	E		
													2	E		
86-27	9.2	.27	-	-	-	110	20	-	35-60	-	130	57-63	1	BF	Q	
													2	BF	Q	
													3	BF		
													4	BF	K(49)M	

IMPACT KEY

Recreation and Cultural

A w/in 1 mile of a developed recreation site
B w/in 1 mile of a specific sightseeing area
C w/in 1 mile of a planned recreation management opportunity
D w/in 1 mile of an archeologic site
E w/in 1 mile of a historic site
F w/in an identified ecologically significant area
G w/in the foreground-middleground visual distance zone
H w/in an area of high user interest and concern for visual resources
I w/in a highly scenic unit

Fish and Wildlife

J Spotted owls pairs included in management plan
K Clearcut in excess of 40 acres (total acres)
L 10-year spacing of clearcut
M Key old-growth within corridor
N Other Spotted Owl conflicts
O Identified potential bald eagle areas
P Key big game cover
Q Clearcut adjacent to stream with coldwater resident fish values
R Clearcut adjacent to stream with coldwater resident and anadromous fish values
S New road crossing stream with known fish values
T Conflict with Alt. 3 Ecoblock

Soils

U Sale on identified problem soil
V Stream crossing on fragile and/or unstable soil
W Roads built on fragile soils
X Roads built on unstable (Whobrey) soils

Table B-1 Five-Year Timber Sale Plan and Potential Conflicts

Sale	Vol. MM bd.ft.	Road Construction (miles) New Surf.	New Unsurf.	Improved Surf.	Improved Unsurf.	Yarding Method (acres) Cable	Full Susp.	Aerial	Avg. Slope %	Homes w/in 1 mi.	Est. Burn (Ac)	Major Soils	Potential Conflicts and Impacts: Sale Unit	Rec. & Cult.	Fish & Wildlife	Soils
86-28	1.7	.13	-	-	-	53	-	-	10-59	-	53	64-66	1			U
													2			UW
86-29	6.2	.84	-	1.52	-	120	-	-	10-59	-	120	501-557	1		R	UWX
													2			UX
													3			U
86-30	10.2	1.97	-	-	-	223	-	-	10-59	4	223	501-557	1		T	UX
													2	E	S	UVX
													3	E		
													4	E		UX
													5	E		U
													6			U
86-31	5.4	1.04	-	-	-	148	-	-	10-59	-	148	501-557	1		R	UVX
													2		R	UW
													3			U
													4		R	UW
													5		RS	
86-32	4.5	1.25	-	.27	-	85	-	-	35-60	-	85	564-63-R	1	G	T	
													2	BDEG	T	
													3	DE		UW
86-33	4.3	.09	-	-	-	88	-	-	10-60	-	88	10-57-66	1			
													2			
													3		PT	
86-34	4.5	.30	-	-	-	81	28	-	10-60	-	109	10-564	1	G		UW
													2	G	Q	
													3	G		
													4	G		
86-35	9.0	-	-	-	-	148	28	-	10-60	3	176	66-501	1			
													2		Q	
													3		QT	U
													4			
													5		LT	U
86-36	7.4	.11	-	.28	-	146	-	-	10-59	1	146	57-10	1			
													2		K(45)T	
													3			
													4			
86-37	5.2	.63	-	.61	-	106	-	-	10-59	-	106	10-57	1			
													2			
													3			
86-38	4.6	.97	-	-	-	80	-	-	10-34	-	80	57-10-63	1		RT	
													2		T	
													3			
86-39	5.2	.51	-	.76	-	91	-	-	10-34	-	91	57-10-66	1			
													2		Q	
													3		L	
													4			
86-40	5.7	.42	-	.28	-	97	-	-	35-60	-	97	66-57	1		PRT	U
													2		T	
													3			
86-41	8.8	1.02	-	.95	-	159	34	-	0-60	2	193	501-557	1	EH		U
													2			U
													3	GH		UW
													4			U
													5	E		UW
													6	E	R	UX
													7	EH		UX
													8	GH		UWX

IMPACT KEY

Recreation and Cultural

A w/in 1 mile of a developed recreation site
B w/in 1 mile of a specific sightseeing area
C w/in 1 mile of a planned recreation management opportunity
D w/in 1 mile of an archeologic site
E w/in 1 mile of a historic site
F w/in an identified ecologically significant area
G w/in the foreground-middleground visual distance zone
H w/in an area of high user interest and concern for visual resources
I w/in a highly scenic unit

Fish and Wildlife

J Spotted owls pairs included in management plan
K Clearcut in excess of 40 acres (total acres)
L 10-year spacing of clearcut
M Key old-growth within corridor
N Other Spotted Owl conflicts
O Identified potential bald eagle areas
P Key big game cover
Q Clearcut adjacent to stream with coldwater resident fish values
R Clearcut adjacent to stream with coldwater resident and anadromous fish values
S New road crossing stream with known fish values
T Conflict with Alt. 3 Ecoblock

Soils

U Sale on identified problem soil
V Stream crossing on fragile and/or unstable soil
W Roads built on fragile soils
X Roads built on unstable (Whobrey) soils

Appendix C

Climate Data

Station	Temperature (°F) Average Annual	January Average Minimum	July Average Maximum	Precipitation (inches) Average Annual
Bandon	51.6	36.7	66.6	55.5
Coquille	53.0	32.9	75.4	59.8
McKinley	53.1	34.0	78.4	62.0
Coos Bay	51.8	36.6	69.0	64.5
North Bend	52.4	38.0	67.5	62.3
Powers	53.7	33.9	79.1	61.6
Brookings	53.4	39.9	67.1	81.9
Gold Beach Ranger Station	52.7	39.9	66.6	81.6
Illahe	55.1	34.6	88.5	85.8
Langlois	53.4	38.3	73.6	99.5
Port Orford	52.9	39.6	68.2	71.5

Soils Appendix D1
Soils of the South Coast and Curry SYUs
Topography, Classification and Parent Material

Soils in the Coast Range

Map 1/ Symbol	Map 2/ Symbol	Mean Elev. (feet)	Taxonomic Classification	Position on Landform	Parent Material
D,E	10	1200-3000	Umbric Dystrochrepts, fine, mixed, mesic-Blachly	Broad ridges and steep slopes	Basalt, siltstone and sandstone
B	12	250-1200	Xeric Halplohumults, clayey, mixed, mesic-Jory	Rolling foothills and slump benches	Sedimentary and Volcanics
C	14	200-1200	Typic Halplohumults, clayey, mixed, mesic-Honeygrove	Broad ridges and side slopes	Sedimentary and Volcanics
H	50	200-1500	Typic Halplohumults, clayey, mixed, mesic-Apt	Uneven slopes in mountainous topography	Siltstone and sandstone
S	54	250-3000	Pachic Haplumbrepts, fine-loamy, mixed, mesic-Slickrock	Mountainous uplands	Sandstone and siltstone
C,D,E,F,G,S	57	250-3000	Typic Haplumbrepts, fine-loamy, mixed, mesic-Preacher	Mountainous uplands	Sandstone and siltstone
D,E,G,K,S	63	250-3000	Typic Haplumbrepts, fine-loamy, mixed, mesic-Bohannon	Mountainous uplands	Sandstone and siltstone
F,G,H,J,K	64	500-3000	Dystric Eutrochrepts, loamy-skeletal, mixed, mesic, shallow-Jason	Mountainous uplands	Sandstone and siltstone
F,H,J,L	66	200-3000	Dystric Eutrochrepts, loamy-skeletal, mixed, mesic-Digger	Mountainous uplands	Sandstone and siltstone
Not Delineated	166	200-3000	Dystric Eutrochrepts, loamy-skeletal, mixed, mesic-unamed	Mountainous uplands	
Not Delineated	564	500-2000	Lythic Dystrochrepts, loamy-skeletal, mixed, mesic-Umproos	Mountainous side slopes and drainage headwalls	Sandstone
Soils in the Klamath Mountains					
L	501	200-1600	Aquic Eutrochrepts, fine-silty over clayey, mixed, mesic-Whobrey	Sideslopes, ridgetops and saddles	Sheared dark sedimentary rocks
M	503	200-2800	Typic Dystrochrepts, fine-loamy, serpentinitic, mesic-unnamed	Mountainous uplands	Serpentine
P	505	200-2800	Dystric Xerochrepts, loamy-skeletal over fragmental, mixed, mesic-unnamed	Steep uplands	(Metamophics) schist and phyllite
N	520	500-2800	Dystric Xerochrepts, fine-loamy, mixed, mesic-unnamed	Buttes and ridges in mountainous uplands	Volcanic rocks
N	521	500-2800	Dystric Xerochrepts, loamy-skeletal, mixed, mesic-unnamed	Buttes and ridges in mountainous uplands	Volcanic rocks
O	524	200-2800	Pachic Haplumbrepts, fine-loamy, mixed, mesic-unnamed	Ridges, side slopes, and slump benches	Hard gray sandstone
O	530	200-2800	Typic Xerumbrepts, loamy-skeletal, mixed, mesic-unnamed	Ridges and sideslopes in mountainous uplands	Hard gray sandstone
O	540	20-1000	Umbric Dystrochrepts, fine, mixed, mesic-Dement	Foothills, ridges and marine terraces	Hard gray sandstone
L	557	200-1800	Typic Eutrochrepts, fine, mixed, mesic-Etelka	Ridgetop knobs, ridge noses and finger ridges	Sheared dark sedimentary rock
P	580	200-2800	Typic Haplohumults, clayey, mixed, mesic-Edson	Mountainous uplands	Schist and phyllite (metamophics)
Miscellaneous Land Types					
	1	10,1000	Miscellaneous land type - Alluvial Land	Floodplains and terraces	Alluvium from sedimentary, metamorphic and volcanic rock
	R	Relatively High	Miscellaneous land type - Rock land	Rock outcrop	Volcanic, metamorphic or sedimentary rocks

1/ Symbols used on Figure 2-2
2/ Symbols used in USDI, BLM 1977, Soils Inventory of the Coos Bay District.

Soils Appendix D2

Soils of the South Coast and Curry SYUs - Properties and Interpretations for Timber Management

Soils in the Coast Range

Soil Series	Texture Surface / Subsoil	Dominant Slope	Profile Depth (inches)	Road Location	Erosion Susceptibility	Compaction Hazard	Regeneration Hazard	Burning Hazard	Remarks
10	SICL / C	5-50	40-60+	S, LS & slope	M	S	Sl	Sl	
12	CL / C	2-50	40-60+	S, LS & slope	M	S	SL-M	Sl	Cutbanks >15 feet high, unstable
14	SICL / SIC	2-50	40-60+	S, LS & slope	M	S	Sl	Sl	
50	CL / SIC	2-50	40-60+	S, slope	M-S	S	Sl	Sl	Severe landslide hazard Severe brush competition
54	GCL / GCL	10-60	40-60+	M-S, slope	M-S	M	Sl	SL	Severe brush competition on slopes < 25 percent
57	CL / CL	5-70	40-60+	M-S, slope depth	M-S	M	Sl	SL	Cutbanks > 15 feet deep are unstable
63	GCL / GCL	5-80	20-40	M-S, slope depth	M-S	M	Sl	Sl	Severe windthrow and landslide hazards
64	GL / VGL	35-90+	10-20	S-depth, slope	M-S	Sl	M-S	S	Grass encroachment problem on steep slopes
66	GL / VGL	5-80	20-40	M-S, depth, slope	SI-S	Sl	Sl-M	SL-S	
166	GL / VGSL	35-80	40-60+	S, slope	M-S	Sl	SL-M	Sl-S	
564	VGSL / VGSL	50-2210	10-20	S, slope	S	Sl	S	S	Severe landslide and windthrow hazards

Soils in the Klamath Mountain

501	SIL / SIL	10-60	40-60+	S, LS, slope & SW	M-S	S	Sl	Sl	Severe windthrow and landslide hazards
503	CbSiCL / CbSiCL	10-60	40-60+	M-S, slope	M-S	M	S	S	Low site (non-forest)
505	GrSil / VGSiCL	35-60+	20-40	M-S, depth, slope	M-S	Sl	M-S	Sl-S	Severe landslide problem where cutbanks > 15 feet
520	L / SICL	10-80	40-60+	S, slope	M-S	M	S	S	Low site (non-forest)
521	GL / GSiCL	35-80	20-40	M-S, depth, slope	M-S	Sl	S	S	Low site (non-forest)

Soils Appendix D2
Soils of the South Coast and Curry SYUs - Properties and Interpretations for Timber Management

Soils in the Coast Range

Soil Series	Texture Surface / Subsoil	Dominant Slope	Profile Depth (in.)	Road Location	Erosion Susceptibility	Compaction Hazard	Regeneration Hazard	Burning Hazard	Remarks
524	GL / GS:CL	10-60	40-60+	M-S, slope	M-S	M	S1-M	S1	High site for merchantable tan oak
530	GL / VGL	35-60	20-40	M-S, depth,slope	M-S	SL	S1	S1	Severe brush competition
540	SIL / SICL	10-60	40-600+	S,LS & slope	S1-S	S	S1	S1	Severe landslide & mod-severe windthrow hazards
557	SIL / SIC	10-60	40-60+	S, slope	S1-S	M	S1	S1	Severe landslide & mod-severe windthrow hazards
580	CL / SIC	10-60	40-60+	S, slope	S1-S	S	S1	S1	Cutbanks greater than 15 feet are unstable
Miscellaneous Land Types									
1	Highly variable	0-10	60+	S, Floods	Variable	Variable	S1	S1	
R	Highly variable		<10	S, Slope & depth	Variable	S1	S	S	

Texture
G = Gravelly
V = Very
S = Sand
Si = Silt
C = Clay
L = Loam
CB = Cobbly

Road Location
LS = low strength
SW = high shrink-swell
S = severe

Compaction Hazard
S1 = slight
M = moderate

Explanation of Ratings and Interpretations

Road Location

The limitation ratings given in this column apply to use of soils for construction and maintenance of access roads that have all-weather surfacing -- rock or oil and rock -- that are expected to carry truck traffic all year.

Excluded from consideration in the ratings in this column are highways designed for fast moving heavy trucks. Also, the ratings cannot substitute for basic soil data and for on-site investigation. Degrees of soil limitation are slight, moderate and severe.

Erosion Susceptibility

This quality is the susceptibility of a soil to erosion when no cover is present. Rate of soil displacement is influenced primarily by soil qualities, physical properties, rainfall intensity and slope gradient. Each of the six items listed within each of the three classes are considered when classifying the area. Classes and rating items are as follows:

Class

Slight
- Potential erosion is not significant to reduce productivity; and these soils:
- contain water-stable aggregates;
- have good infiltration and percolation rates;
- have adequate depth to store most of the normal precipitation;
- contain no restrictive layers;
- occur on gentle slopes;

Moderate
- Potential erosion is significant to reduce productivity but not to the point of entirely restricting production;
- contain aggregates that are not water stable;
- have moderate infiltration and percolation rates;
- have moderate depths to store only part of the normal precipitation (available water holding capacity);
- occur on moderate slopes.

Severe
- Potential erosion will cause a reduction in productivity to practically zero;
- contain very unstable aggregates;
- have slow infiltration and percolation rates;
- have little soil for water storage;
- contain restrictive layers;
- occur on steep slopes.

Compaction Hazard

Compaction results from pressing soil particles together into a close state of contact. The amount of compaction which can be obtained is principally influenced by the soil's physical properties, moisture content, type and amount of compaction effort. Soils are rated as having a slight, moderate or severe susceptibility to a compactive force that reduces its productivity by restricting root development and internal air and water movement. Slight means soil properties generally are favorable for use under most conditions. Moderate means soil properties are unfavorable and, under some conditions, use should be restricted. Severe means soil properties are so unfavorable that use at any time could create soil conditions very difficult to correct.

Regeneration Hazard

Regeneration hazard is given for bare-root stock with no distinction made for age or species. Regeneration hazard is defined as the probable success of establishing new plantings as influenced by soil or topographic conditions. Three classes are recognized. The ratings are based on the percent of plantations that are expected to regenerate on the first attempt. A slight hazard means success on more than 80 percent of the plantations. A moderate hazard means success on 30 to 80 percent of the plantations. A severe hazard means success on less than 30 percent of the plantations.

Soils with a shallow rooting depth, either because of a high water table or a shallow depth to bedrock, have a severe windthrow hazard. Soils with a significant windthrow hazard are identified in the remarks column.

Burning Hazard

The burning hazard (broadcast burning) refers to the threat that wild fires or slash burning has to increase the runoff and erosion hazards, and to reduce the success of regeneration. Field observations have shown that broadcast burning on slopes steeper than 80 percent promotes conditions favorable for a severe erosion hazard by dry ravelling. Actual measurements of ravel material in the H.J. Andrews Experimental Forest, Blue River, Oregon, showed a ravelling loss as great as 1,050 tons per square kilometer (approximately 1,500 tons/square mile, or 2.3 tons/acre) between the 9th and 14th month following the burn. The ravel losses represent only an estimated 40 percent of the total erosion losses. Ravelling becomes insignificant 2 years after a burn if vegetation becomes reestablished.

It has been observed that a hot burn temporarily increases the runoff and erosion on the Jason (64), Digger (66), Unit 166, Unit 521, Unit 530 and Umpcoos (564) soils because of the development of a water-repellent or non-wettable condition brought about by burning. This condition tends to disappear about a year after the burn.

The soils have been rated into two classes of broadcast burning hazard. These classes are defined as follows:

Slight Hazard: Broadcast burning of slash will not significantly increase the erosion and ravelling hazard, and will not reduce the regeneration and productivity potential of these soils. The soils are mostly moderately deep to deep, nonskeletal and occur on slopes of less than 80 percent.

Severe Hazard: Broadcast burning of slash will significantly increase surface runoff, erosion and ravelling hazard, and will reduce the regeneration and productive potential for these soils. They are mostly shallow and moderately deep, skeletal soils on slopes steeper than 80 percent.

Other Limiting Factors

Flooding: Most lands subject to flooding are coastal or lowland; however, BLM lands are mostly upland. Flooding that does occur happens in intense winter storms with rapid stream flow and catastrophic erosion and deposition. This type of flooding greatly aggravated by debris -- called "sluice-out" locally -- can be reduced by preventing slash and debris from getting into drainages.

Methodology for Erosion

Transportation System

Acres of roads were divided into categories to aid in calculations of erosion.

Landings are assumed to be built using the same methods as roads, but the time required to construct landings is less than that required to build long roads.

Due to the rugged topography in SCCSYUs, cutbanks and fillslopes will occur on 75 percent of all roads, and cutbanks and fillslopes are about 60 percent of the road prism (profile of a road).

Using the sample 5-year timber sale as a model, all roads were divided into sub-categories of long spurs and short spurs.

Long spurs average 1.56 miles in length and would require an average 150 days to be constructed.

Short spurs average 0.46 miles in length and would require 100 days to be constructed. Short spurs would be 75 percent of all roads, and long spurs would be 25 percent. On all roads, the running surface would be rock paved and would be equal to 40 percent of the road prism where cut and-fill occurred, and 100 percent where no cut-and-fill are needed. All cut-and-fill slopes are to be hydromulched.

Erosion of cut-and-fill slopes decreases as vegetation increases.

The Universal Soil Loss Equation (USLE) was used to quantify erosion for roadbuilding, clearcutting and burning.

Erosion = RKLSCP where
R = rainfall factor
K = soil erodability factor
LS = slope factor
C = cover index factor
P = a factor (not used) involving agricultural practices.

present erosion = 0.14 tons/acre/year
R = 53.5
K = 0.32 (average)
LS = 8.4
C = variable, present undisturbed forest C = 0.001
E present = RKLSC
0.14 = (53.5) (0.32) (8.4) (0.001) if R, K, LS are held

constant, then present erosion (E_p) will equal a constant (k) times 0.001 (C_p) and future erosion (E_f) would equal (k) x (future C [C_f])

$E_p = (k) \times C_p$ and

$E_f = (k) \times C_f$ which is

$E_p/C_p = k = E_f/C_f$, or

$E_p/C_p = E_f/C_f$,

Therefore, where C_f changes, a corresponding change in E_f is expected.

Roadbuilding

Bulldozer disturbs surface, destroys all vegetation, and creates a bared soil condition

C = 120 to 1.25

Soil compaction begins or a soil binder is added

C = 0.65 to 0.85

Asphalt emulsion, rock paving or other protection afforded road surface

C = 0.015

At this time erosion equals about 2.1 ton/acre/year.

Source: USDA - SCS Tech. Notes numbers 10 (1977); 32 (1974); 12 (1978); 37 (1977) and USLE.

Clearcutting

Clearcutting and yarding	C=0.90
following first rain	C=0.85
Brush and grass begin	C=0.40 to 0.35
Seedlings planted	
2-12 months	C=0.40 to 0.05
12-18 months	C=0.05 to 0.01

Slash burning

Soil erodability (K factor) altered by:

1. litter cover completely burned
   K increases toward 1.0
2. litter cover partially burned
   K increases toward 0.8
3. very hot, slow fire, soil structure affected
   K increases toward 0.9
4. very fast, cool burn, soil structure partially affected
   K approximates 0.40 to 0.50

Water Resources Appendix E
Mean Annual Yields of Water and Sediment from Major Rivers
in the South Coast and Curry SYUs

Drainage Basin	Drainage Area (square miles)	Annual Yield (acre-feet)	Sediment Yield (acre-feet)
Umpqua	3,623	5,410,000	543
Coquille	1,058	2,400,000	159
Coos	415	1,590,000	62

Source: Townsend et al 1977

Gaging Station	Drainage Area (square miles	Average Annual Yield (acre-feet)	Discharge Extremes (maximum) (cubic feet per second (minimum)	
Ten Mile Creek near Lakeside	87	244,900	3,330	(Dec. 27, 1964)
			2.0	(Aug. 29, Sept. 2, 1967)
West Fork Millicoma River near Allegany	46.9	190,500	8,100	(Nov. 24, 1960)
			1.8	(Sept. 5,9, 1965)
South Fork Coquille River at Powers	169	576,700	48,900	(Dec. 22, 1964)
			12	(Oct. 167-20, 1974)
				(Oct. 5, 1961)
				(Sept. 22-25-27-30, 1939)
North Fork Coquille River near Fairview	74.0	222,400	7,760	(March 2, 1972)
			2.0	(Sept. 9-10, 1967)
Rogue River near Agness	3,939	4,798,000	290,000	(Dec. 23, 1964)
			608	(July 9-10, 1968)
Chetco River near Brookings	271	1,763,000	65,800	(January 16, 1971)
			45	(October 21-23, 1974)
Umpqua River at Elkton	3,683	5,494,000	265,000	(December 23, 1964)
			640	(July 18, 1976)

Source: U.S. Geological Survey. Water Data Report OR-76-1
Water Resources Division, Portland, Oregon.

Appendix F

Species Utilizing Old Growth, Mid-age and Riparian Zones for Optimum Habitat.

Mid-age and Old Growth		Riparian	
Amphibians/Reptiles		**Amphibians/Reptiles**	
Siskiyou Mountain salamander	Plethodon stormi	Northwestern salamander	Ambystoma gracile
Oregon slender salmander	Batrachoseps wrighti	Pacific giant salamander	Dicamptodon ensatus
		Olympic salamander	Rhyacotrition olympicus
Birds		Rough-skinned newt	Taricha granulosa
		Tailed frog	Ascaphus truei
Barrow's goldeneye	Bucephala islandica	Western toad	Bufo boreas
Northern goshawk	Accipiter gentilis	Pacific tree frog	Hyla regilla
Golden eagle	Aquila chrysaetos	Red-legged frog	Rana aurora
Bald eagle	Haliaeetus leucocephalus	Spotted frog	Rana pretiosa
Osprey	Pandion haliaetus	Cascade frog	Rana cascadae
Blue grouse	Dendragapus obscurus	Foothill yellow-legged frog	Rana boylii
Common screech owl	Otus asio (c)	Bull frog	Rana catesbeiana
Pigmy owl	Glaucidium gnoma (c)	Western skink	Eremeces skiltonianus
Northern spotted owl	Strix occidentalis caurina (c)	Western pond turtle	Clemmys marmorata
Saw-whet owl	Aegolius acadicus (c)	Common garter snake	Thamnophis sirtalis
Vaux's swift	Chaetura vauxi (c)	Western terrestrial garter snake	Thamnophis elegans
Pileated woodpecker	Dryocapus pileatus (c)	Western aquatic garter snake	Thamnophis couchi
Hammond's flycatcher	Empidonax hammondi		
Tree swallow	Iridoprocne bicolor (c)	**Birds**	
Purple martin	Progne subis (c)		
Gray jay	Perisoreus canadensis	Great blue heron	Ardea herodias
Northern raven	corvus corax	Green heron	Butorides striatus
Chestnut-backed chickadee	Parus rufescens (c)	Black-crowned night heron	Nycticorax nycticorax
Red-breasted nuthatch	Sitta canadensis (c)	Mallard	Anas platyrhynchos
Brown creeper	Certhia familaris (c)	Wood duck	Aix sponsa (c)
Varied thrush	Ixoreus naevius	Harlequin duck	Histrionicus histrionicus
Hermit thrush	Catharus guttata	Hooded merganser	Lophodytes cucullatus (c)
Golden-crowned kinglet	Regulus satrapa	Common merganser	Mergus merganser (c)
Ruby-crowned kinglet	Regulus calendula	Red-breasted merganser	Mergus serrator
Townsend's warbler	Dendroica townsendi	Bald eagle	Haliaeetus leucocephalus
Hermit warbler	Dendroica occidentalis	Osprey	Pandion haliaetus
Red crossbill	Loxia curvirostra	Ruffed grouse	Bonasa unbellus
		Spotted sandpiper	Actitus macularia
Mammals		Solitary sandpiper	Tringa solitaria
		Common screech owl	Otus asio (c)
Shrew-mole	Neurotrichus gibbsi	Belted kingfisher	Megaceryle alcyon
Coast mole	Scapanus orarius	Hairy woodpecker	Picodes villosis (c)
Little brown myotis	Myotis lucifugus (c)	Downy woodpecker	Picodes pubescens (c)
Yuma myotis	Myotis yumanenis (c)	Willow flycatcher	Empidonax traillii
Long eared myotis	Myotis evotis (c)	Western flycatcher	Empidonax difficilis (c)
Long-legged myotis	Myotis volans (c)	Tree swallow	Iridoprocne bicolor (c)
California myotis	Myotis californicus (c)	Barn swallow	Hirundo rustica
Silver-haired bat	Lasionycteris noctivagans (c)	Purple martin	Progne subia (c)
Big brown bat	Eptesicus fuscus (c)	Black-capped chickadee	Parus atricapillus (c)
Hoary bat	Lasiurus cinereus (c)	Dipper	Cinclus mexicanus
Chickaree	Tamiasciurus douglasi	Winter wren	Troglodytes troglodytes (c)
Northern flying squirrel	Glaucomys sabrinus (c)	Swainson's thrush	Catharus ustulata
Bushy-tailed woodrat	Neotoma cinerea (c)	Red-eyed vireo	Vireo olivaceus
Western red-backed vole	Clethrionomys occidentalis	Common yellowthroat	Geothlypis trichas
Red tree vole	Phenacomys longicadus (c)	Yellow-breasted chat	Icteria virens
Marten	Martes americana (c)	Red-winged blackbird	Agelaius phoeniceus
Fisher	Martes pennanti	Lincoln's sparrow	Melospiza lincolnii
Short-tailed weasel	Mustela erminea		
Cougar	Felis concolor	**Mammals**	
Roosevelt elk	Cervus canadensis roosevelti (sc)		
Black-tailed deer	Odocoileus hemionus columbianus (sc)	Pacific shrew	Sorex pacificus
		Marsh shrew	Sorex bendirii
		Yaquina shrew	Sorex yaquinae
		Yuma myotis	Myotis yumanenis (c)
		Beaver	Castor canadensis
		White-footed vole	Phenacomys albipes
		Townsend vole	Microtus townsendi
		Long-tailed vole	Microtus longicandus
		Muskrat	Ondatra zibethica
		Pacific jumping mouse	Zapus trinatatus
		Nutria	Myocastor coypus
		Raccoon	Procyon lotor (c)
		Mink	Mustela vison
		River otter	Lutra canadensis

sc = Species which use midage and old growth forests during periods of extreme winter conditions as survival cover.

c = Cavity dwellers

Appendix G

Methodology for Air Pollution

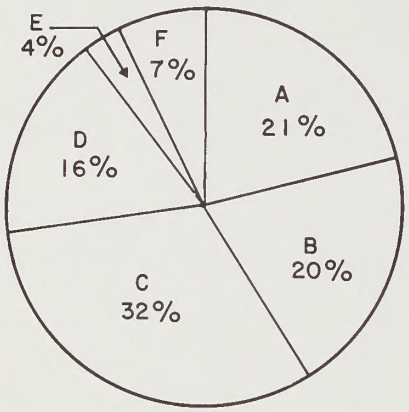
1. Tons of slash per acre was obtained from the Fire Management Officer of Coos Bay District 75-90 tons of slash per acre of clearcut, not gross yarded.

2. Acres clearcut times 75-90 tons slash gives range of total slash, which is assumed to be 30 percent burned. Total slash times 17 pounds particulates per ton gives airborne particulate weights.

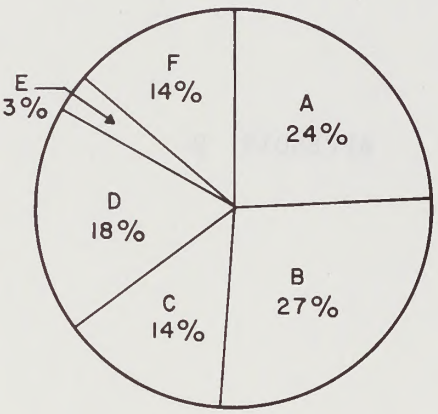
3. From Table 3-2, particulates, hydrocarbons, nitrogen oxides, and organic acids equals 44 pounds of pollutants per ton burned slash. Aldehydes (0.01 lbs ton) were insignificant.

APPENDIX H

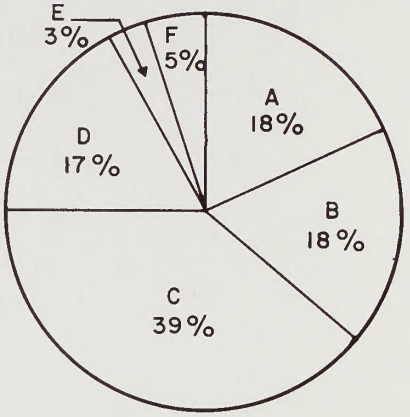
PREDICTED ALTERATION OF WILDLIFE HABITAT ON COMMERCIAL FOREST LANDS IN THE ENTIRE SOUTH COAST AREA



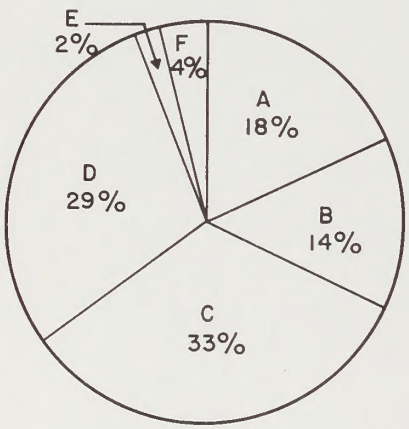
FIRST DECADE



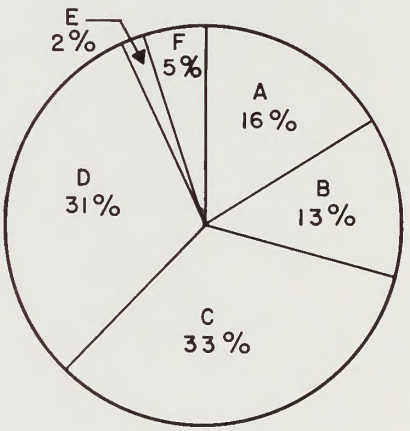
EXISTING



SECOND DECADE



FIFTH DECADE

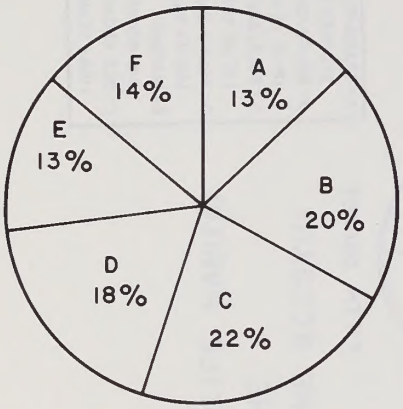


TENTH DECADE

A=GRASS/FORB (NON-STOCKED & 0-7 YEARS)
B=BRUSH/SEEDLING (8-15 YEARS)
C=POLE/SAPLING (16-45 YEARS)
D=YOUNG 2nd GROWTH (46-115 YEARS)
E=MATURE (116-195 YEARS)
F=OLD GROWTH (196+ YEARS)

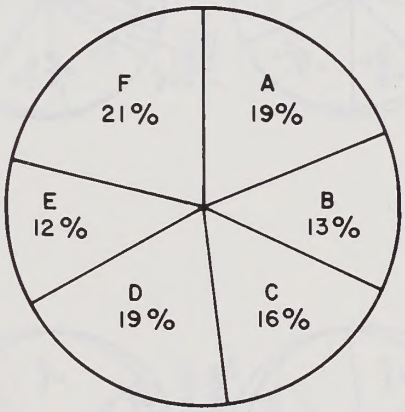
NOTE: These are rough projections based on information obtained from U.S. Forest Service, Oregon State Department of Forestry, the Industrial Forestry Association and Beuter et al (1976). BLM's portion was calculated at the proposed action level. Since actual plans had not been made by the other land owners/managers, the structure could not be accurately predicted and may vary.

ALTERATION OF WILDLIFE HABITAT ON THE TIMBER LANDS OF THE SCCSYUs

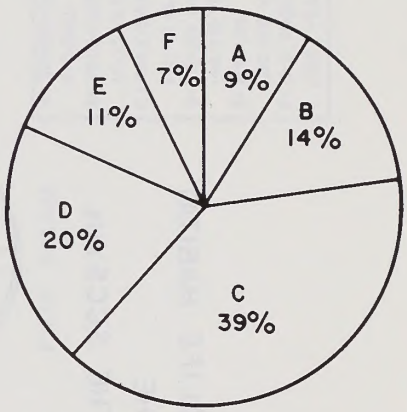


FIRST DECADE

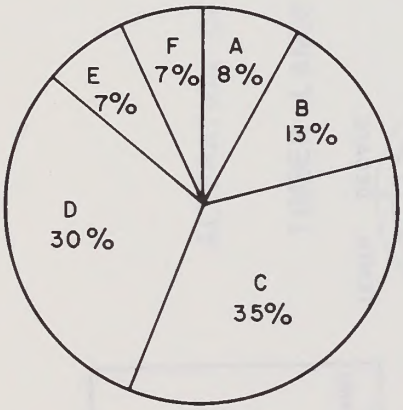
PROPOSED ACTION



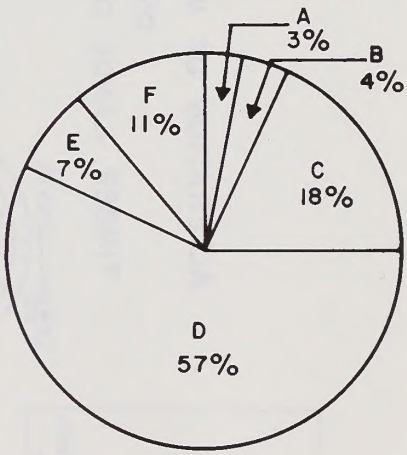
EXISTING



SECOND DECADE



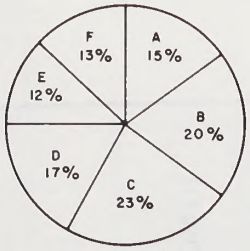
FIFTH DECADE



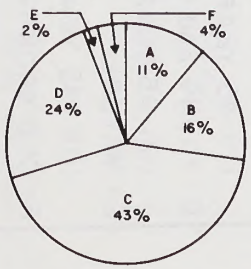
TENTH DECADE

A= GRASS/ FORB (NON-STOCKED & 0-7 YEARS)
B= BRUSH/SEEDLING (8-15 YEARS)
C= POLE/SAPLING (16-45 YEARS)
D= YOUNG 2nd GROWTH (46-115 YEARS)
E= MATURE (116-195 YEARS)
F= OLD GROWTH (196+ YEARS)

ALTERATION OF WILDLIFE HABITAT
ON THE
TIMBER LANDS OF THE SCCSYUs

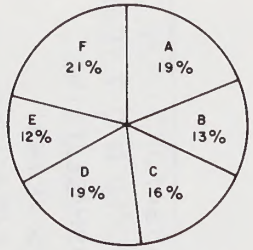


FIRST DECADE

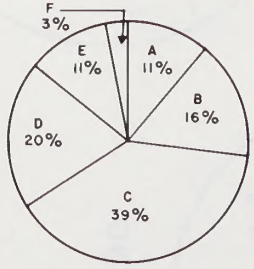


FIFTH DECADE

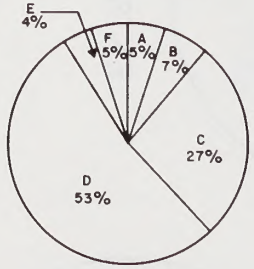
ALTERNATIVE NO 1



EXISTING

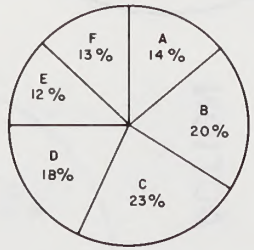


SECOND DECADE

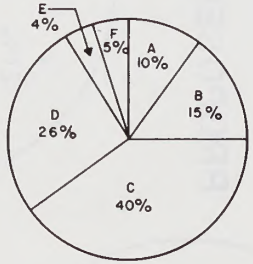


TENTH DECADE

A = GRASS/FORB (NON-STOCKED & 0-7 YEARS)
B = BRUSH/SEEDLING (8-15 YEARS)
C = POLE/SAPLING (16-45 YEARS)
D = YOUNG 2nd GROWTH (46-115 YEARS)
E = MATURE (116-195 YEARS)
F = OLD GROWTH (196+ YEARS)

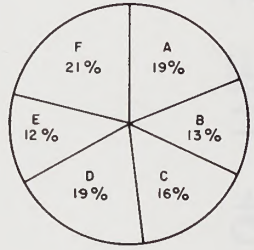


FIRST DECADE

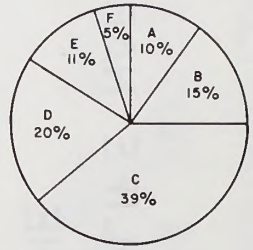


FIFTH DECADE

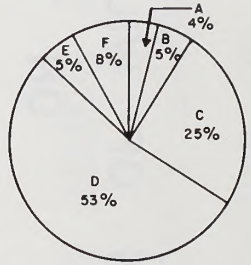
ALTERNATIVE NO 2



EXISTING



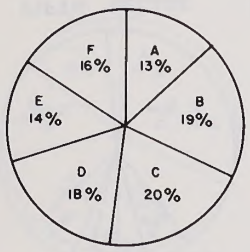
SECOND DECADE



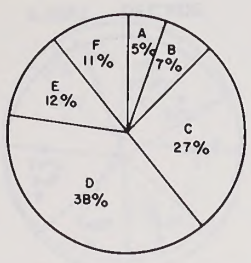
TENTH DECADE

A = GRASS/FORB (NON-STOCKED & 0-7 YEARS)
B = BRUSH/SEEDLING (8-15 YEARS)
C = POLE/SAPLING (16-45 YEARS)
D = YOUNG 2nd GROWTH (46-115 YEARS)
E = MATURE (116-195 YEARS)
F = OLD GROWTH (196+ YEARS)

ALTERATION OF WILDLIFE HABITAT
ON THE
TIMBER LANDS OF THE SCCSYUs

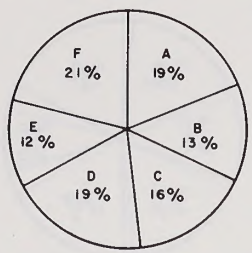


FIRST DECADE

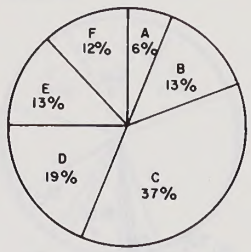


FIFTH DECADE

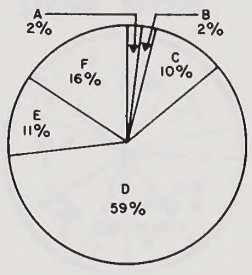
ALTERNATIVE NO3



EXISTING

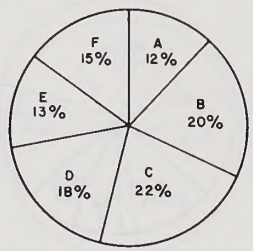


SECOND DECADE

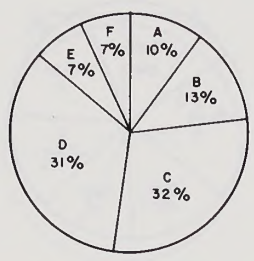


TENTH DECADE

- A= GRASS / FORB (NON-STOCKED & 0-7 YEARS)
- B= BRUSH/SEEDLING (8-15 YEARS)
- C= POLE/SAPLING (16-45 YEARS)
- D= YOUNG 2nd GROWTH (46-115 YEARS)
- E= MATURE (116-195 YEARS)
- F= OLD GROWTH (196+ YEARS)

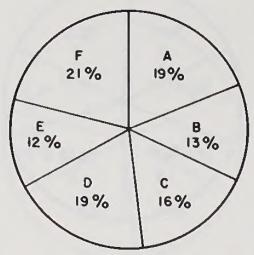


FIRST DECADE

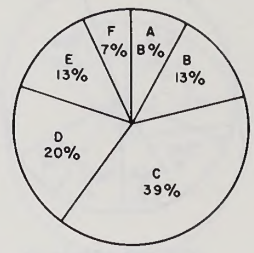


FIFTH DECADE

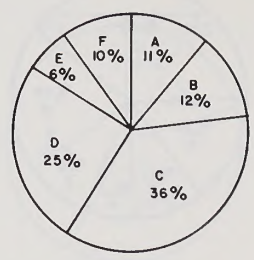
ALTERNATIVE NO 4



EXISTING



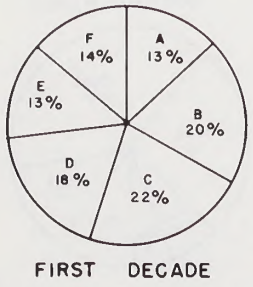
SECOND DECADE



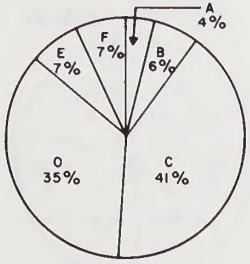
TENTH DECADE

- A= GRASS/FORB (NON-STOCKED & 0-7 YEARS)
- B= BRUSH/SEEDLING (8-15 YEARS)
- C= POLE/SAPLING (16-45 YEARS)
- D= YOUNG 2nd GROWTH (46-115 YEARS)
- E= MATURE (116-195 YEARS)
- F= OLD GROWTH (196+ YEARS)

ALTERATION OF WILDLIFE HABITAT
ON THE
TIMBER LANDS OF THE SCCSYUs

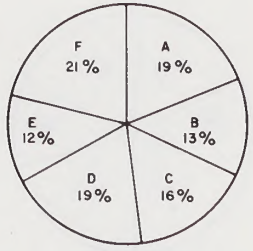


FIRST DECADE



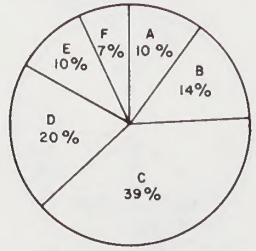
FIFTH DECADE

ALTERNATIVE NO 5

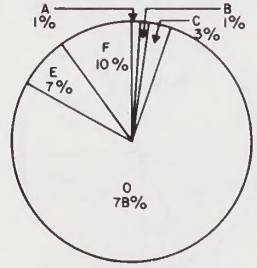


EXISTING

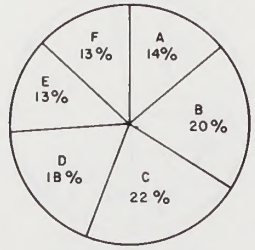
A = GRASS/ FORB (NON-STOCKED & 0-7 YEARS)
B = BRUSH/ SEEDLING (8-15 YEARS)
C = POLE/SAPLING (16-45 YEARS)
D = YOUNG 2nd GROWTH (46-115 YEARS)
E = MATURE (116-195 YEARS)
F = OLD GROWTH (196+ YEARS)



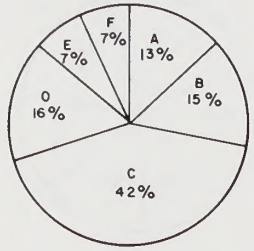
SECOND DECADE



TENTH DECADE

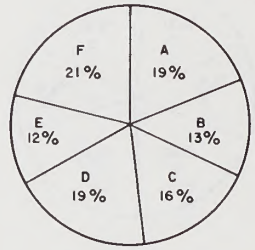


FIRST DECADE



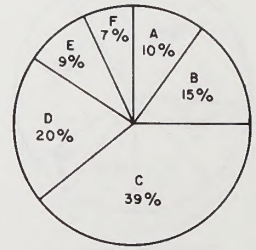
FIFTH DECADE

ALTERNATIVE NO 6

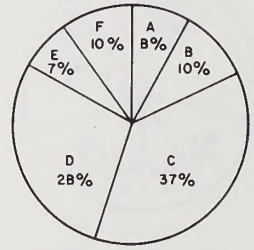


EXISTING

A = GRASS/FORB (NON-STOCKED & 0-7 YEARS)
B = BRUSH/SEEDLING (8-15 YEARS)
C = POLE/SAPLING (16-45 YEARS)
D = YOUNG 2nd GROWTH (46-115 YEARS)
E = MATURE (116-195 YEARS)
F = OLD GROWTH (196+ YEARS)

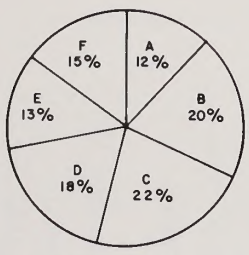


SECOND DECADE

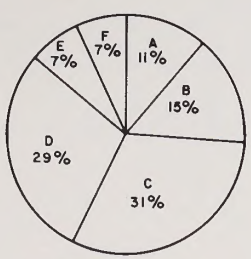


TENTH DECADE

ALTERATION OF WILDLIFE HABITAT
ON THE
TIMBER LANDS OF THE SCCSYUs

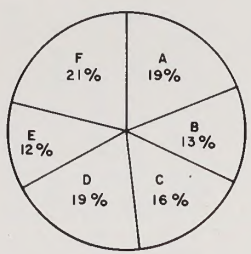


FIRST DECADE



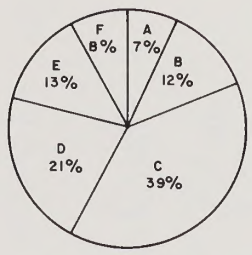
FIFTH DECADE

ALTERNATIVE NO 7

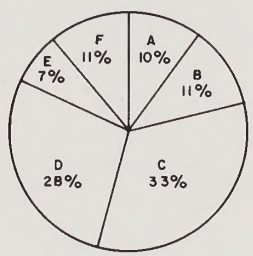


EXISTING

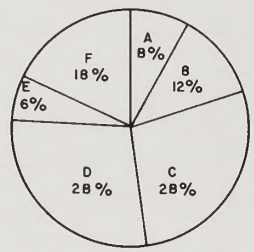
A = GRASS/FORB (NON-STOCKED & 0-7 YEARS)
B = BRUSH/SEEDLING (8-15 YEARS)
C = POLE/SAPLING (16-45 YEARS)
D = YOUNG 2nd GROWTH (46-115 YEARS)
E = MATURE (116-195 YEARS)
F = OLD GROWTH (196+ YEARS)



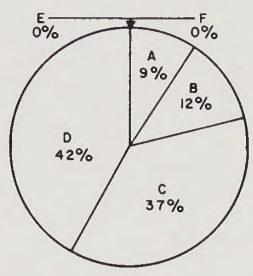
SECOND DECADE



TENTH DECADE

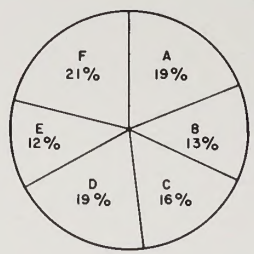


FIRST DECADE



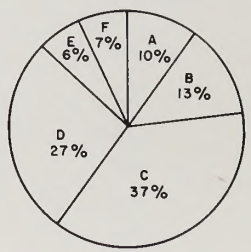
FIFTH DECADE

ALTERNATIVE NO 8

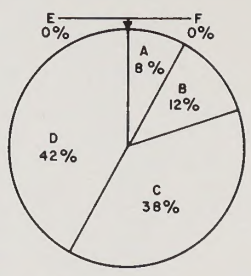


EXISTING

A = GRASS/FORB (NON-STOCKED & 0-7 YEARS)
B = BRUSH/SEEDLING (8-15 YEARS)
C = POLE/SAPLING (16-45 YEARS)
D = YOUNG 2nd GROWTH (46-115 YEARS)
E = MATURE (116-195 YEARS)
F = OLD GROWTH (196+ YEARS)



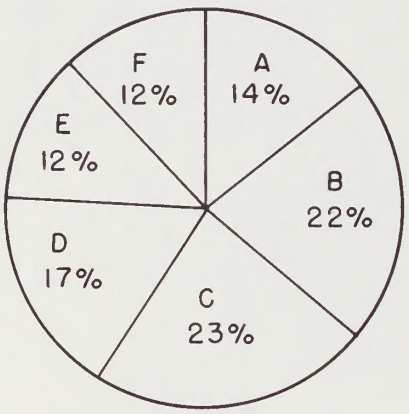
SECOND DECADE



TENTH DECADE

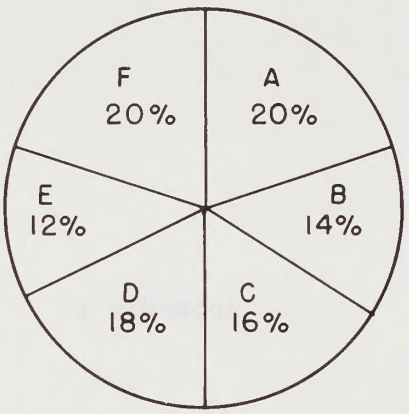
Appendix I

ALTERATION OF WILDLIFE HABITAT ON TIMBER PRODUCTION LANDS

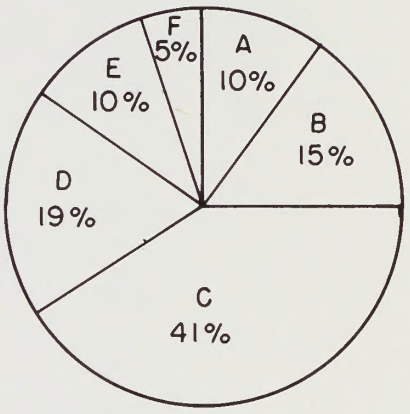


FIRST DECADE

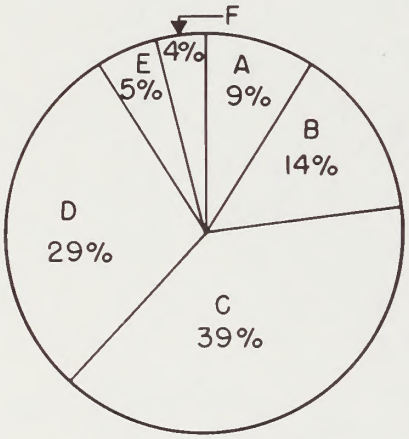
PROPOSED ACTION



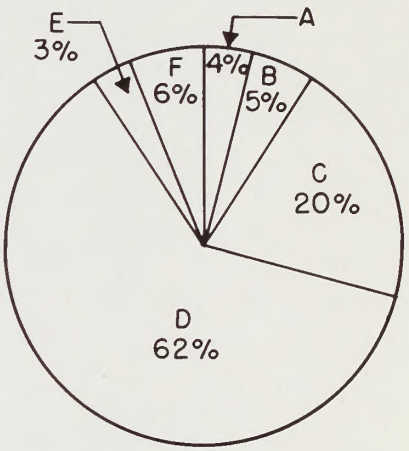
EXISTING



SECOND DECADE



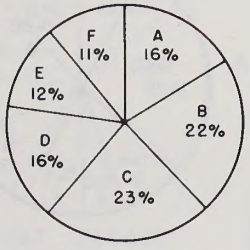
FIFTH DECADE



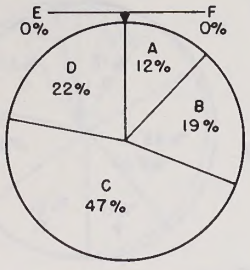
TENTH DECADE

A = GRASS/FORB (NON-STOCKED & 0-7 YEARS)
B = BRUSH/SEEDLING (8-15 YEARS)
C = POLE/SAPLING (16-45 YEARS)
D = YOUNG 2nd GROWTH (46-115 YEARS)
E = MATURE (116-195 YEARS)
F = OLD GROWTH (196+ YEARS)

ALTERATION OF WILDLIFE HABITAT ON TIMBER PRODUCTION LANDS

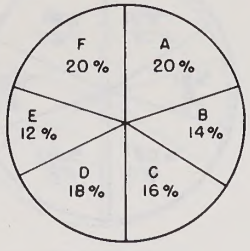


FIRST DECADE



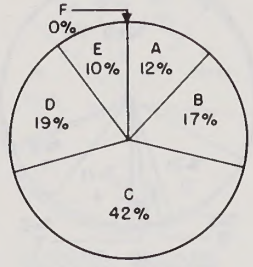
FIFTH DECADE

ALTERNATIVE NO 1

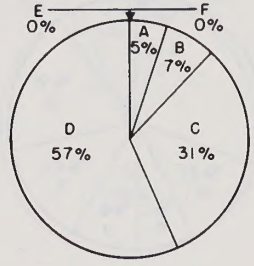


EXISTING

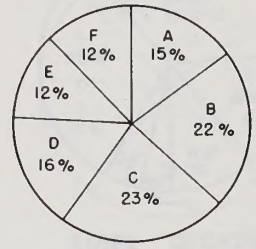
A = GRASS/FORB (NON-STOCKED & 0-7 YEARS)	
B = BRUSH/SEEDLING (8-15 YEARS)	
C = POLE/SAPLING (16-45 YEARS)	
D = YOUNG 2nd GROWTH (46-115 YEARS)	
E = MATURE (116-195 YEARS)	
F = OLD GROWTH (196+ YEARS)	



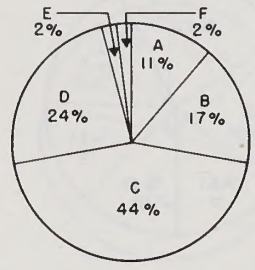
SECOND DECADE



TENTH DECADE

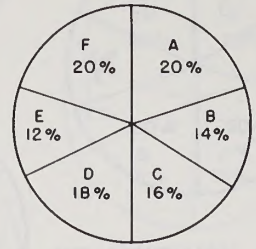


FIRST DECADE



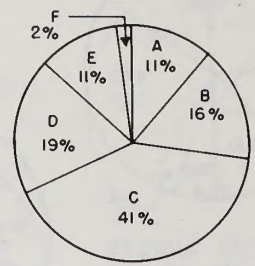
FIFTH DECADE

ALTERNATIVE NO 2

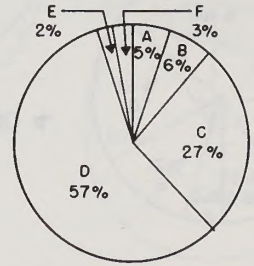


EXISTING

A = GRASS/FORB (NON-STOCKED & 0-7 YEARS)	
B = BRUSH/SEEDLING (8-15 YEARS)	
C = POLE/SAPLING (16-45 YEARS)	
D = YOUNG 2nd GROWTH (46-115 YEARS)	
E = MATURE (116-195 YEARS)	
F = OLD GROWTH (196+ YEARS)	

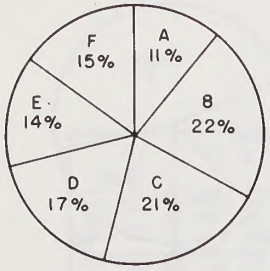


SECOND DECADE

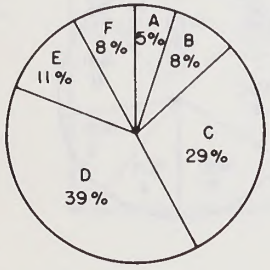


TENTH DECADE

ALTERATION OF WILDLIFE HABITAT
ON
TIMBER PRODUCTION LANDS

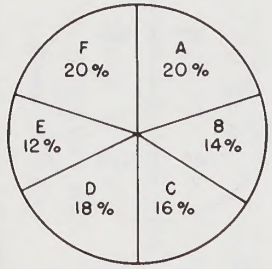


FIRST DECADE



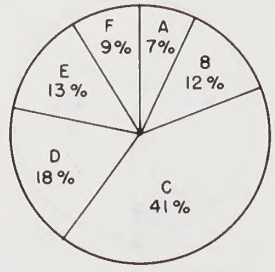
FIFTH DECADE

ALTERNATIVE NO 3

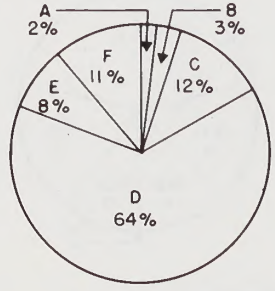


EXISTING

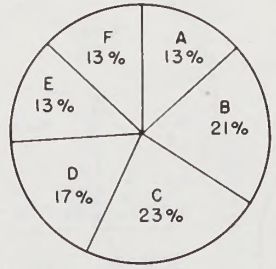
A = GRASS/FORB (NON-STOCKED & 0-7 YEARS)
B = BRUSH/SEEDLING (8-15 YEARS)
C = POLE/SAPLING (16-45 YEARS)
D = YOUNG 2nd GROWTH (46-115 YEARS)
E = MATURE (116-195 YEARS)
F = OLD GROWTH (196+ YEARS)



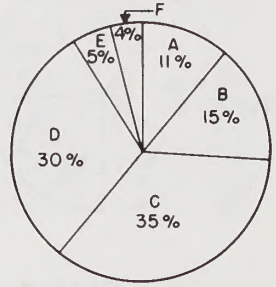
SECOND DECADE



TENTH DECADE

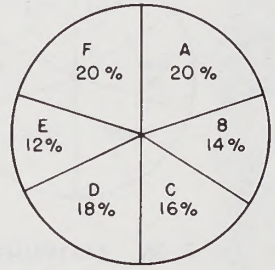


FIRST DECADE



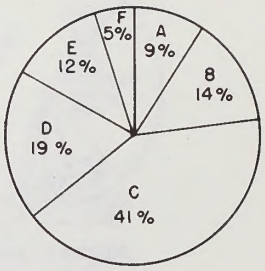
FIFTH DECADE

ALTERNATIVE NO 4

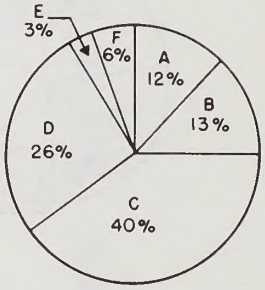


EXISTING

A = GRASS/FORB (NON-STOCKED & 0-7 YEARS)
B = BRUSH/SEEDLING (8-15 YEARS)
C = POLE/SAPLING (16-45 YEARS)
D = YOUNG 2nd GROWTH (46-115 YEARS)
E = MATURE (116-195 YEARS)
F = OLD GROWTH (196+ YEARS)

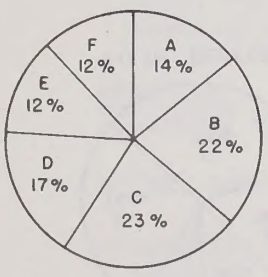


SECOND DECADE

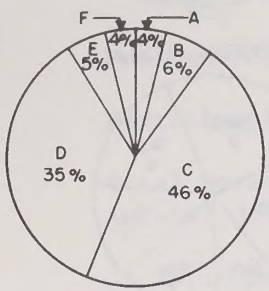


TENTH DECADE

ALTERATION OF WILDLIFE HABITAT
ON
TIMBER PRODUCTION LANDS

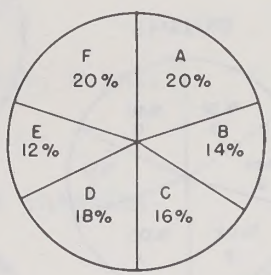


FIRST DECADE



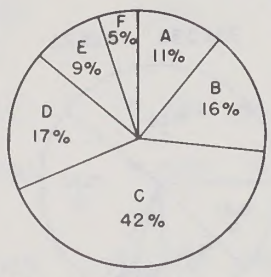
FIFTH DECADE

ALTERNATIVE NO 5

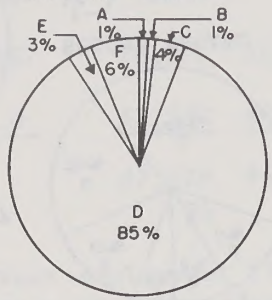


EXISTING

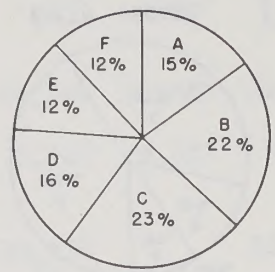
A= GRASS/FORB (NON-STOCKED & 0-7 YEARS)
B= BRUSH/SEEDLING (8-15 YEARS)
C= POLE/SAPLING (16-45 YEARS)
D= YOUNG 2nd GROWTH (46-115 YEARS)
E= MATURE (116-195 YEARS)
F= OLD GROWTH (196+ YEARS)



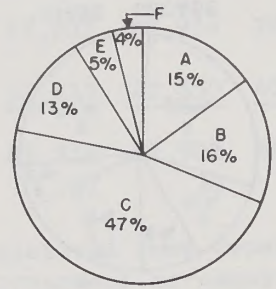
SECOND DECADE



TENTH DECADE

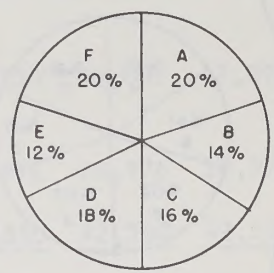


FIRST DECADE



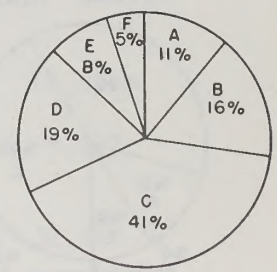
FIFTH DECADE

ALTERNATIVE NO 6

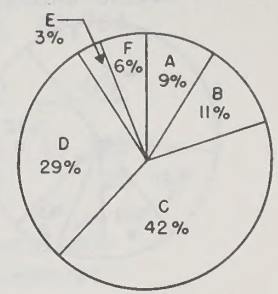


EXISTING

A= GRASS/FORB (NON-STOCKED & 0-7 YEARS)
B= BRUSH/SEEDLING (8-15 YEARS)
C= POLE/SAPLING (16-45 YEARS)
D= YOUNG 2nd GROWTH (46-115 YEARS)
E= MATURE (116-195 YEARS)
F= OLD GROWTH (196+ YEARS)

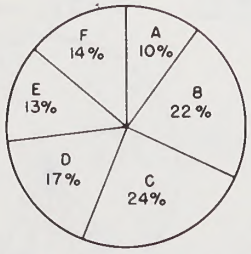


SECOND DECADE

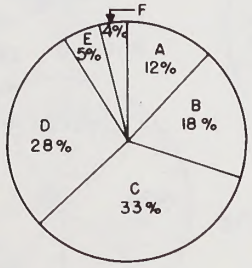


TENTH DECADE

ALTERATION OF WILDLIFE HABITAT
ON
TIMBER PRODUCTION LANDS

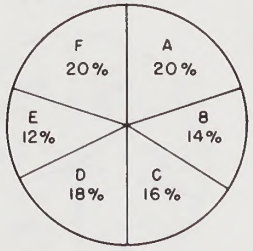


FIRST DECADE



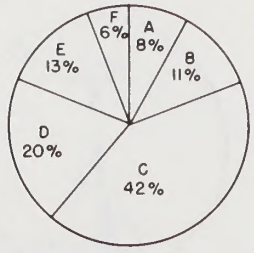
FIFTH DECADE

ALTERNATIVE NO 7

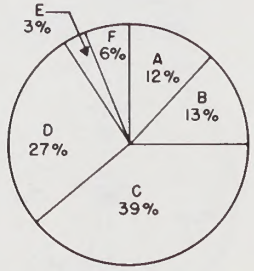


EXISTING

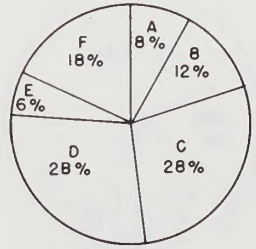
A = GRASS/FORB (NON-STOCKED & 0-7 YEARS)	
B = BRUSH/SEEDLING (8-15 YEARS)	
C = POLE/SAPLING (16-45 YEARS)	
D = YOUNG 2nd GROWTH (46-115 YEARS)	
E = MATURE (116-195 YEARS)	
F = OLD GROWTH (196+ YEARS)	



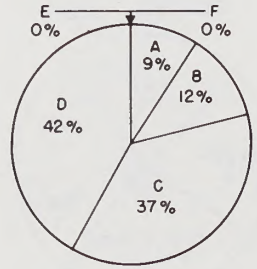
SECOND DECADE



TENTH DECADE

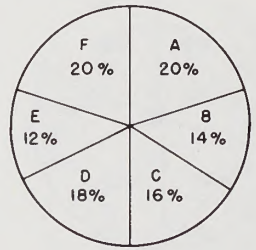


FIRST DECADE



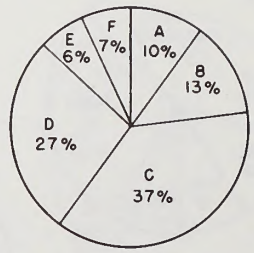
FIFTH DECADE

ALTERNATIVE NO 8

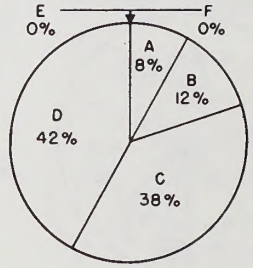


EXISTING

A = GRASS/FORB (NON-STOCKED & 0-7 YEARS)	
B = BRUSH/SEEDLING (8-15 YEARS)	
C = POLE/SAPLING (16-45 YEARS)	
D = YOUNG 2nd GROWTH (46-115 YEARS)	
E = MATURE (116-195 YEARS)	
F = OLD GROWTH (196+ YEARS)	



SECOND DECADE



TENTH DECADE

Appendix J Estimation of Employment in Forest Management [1/]

	Worker-days /acre	Alternatives (acres treated during decade)								
		P.A.	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	Alt. 8
Site Preparation:										
Broadcast burning [2/]	1.250	10,910	10,410	10,597	9,589	10,910	10,910	10,910	10,910	2,800
Herbicide:										
Aerial	.025	7,800	7,800	7,800	7,800	-0-	7,800	7,800	7,800	7,800
Cut stump treatment	.750	1,200	1,200	1,200	1,200	-0-	1,200	1,200	1,200	1,200
Brush field conversion	.667	6,834	7,109	7,109	5,251	6,834	6,834	6,834	6,834	-0-
Hardwood conversion	1.667	1,276	500	500	1,528	1,276	1,276	1,276	1,276	-0-
Planting:										
Initial & replant	.667	59,393	68,804	65,145	44,788	56,583	61,125	63,164	54,299	47,327
Animal control	.500	9,527	9,527	9,527	9,527	9,527	9,527	9,527	9,527	9,527
Plantation mtnc. & rel:										
Aerial	.025	51,610	60,645	57,141	39,952		53,110	55,005	47,026	52,610 [3/]
Hand	1.667					2,810				
Precommercial thinning	.667	28,976	32,631	30,160	17,837	28,976	28,976	28,976	28,976	10,761
Fertilization	.0	42,550	46,205	43,734	31,411	42,550	42,550	42,550	42,550	-0-
Total worker-days [4/]		87,278	94,538	90,545	67,316	87,902	88,471	89,864	83,806	49,220
Total jobs [5/]		35	38	36	27	35	35	36	34	20

1/ Employment net of timber harvest employment (logging and associated road construction and slash burning) calculated by multiplying estimates of worker-days/acre times treatment acreages. Worker-days/acre (except burning) estimated by Forest Development Section, Oregon State Office.

2/ Most (95 percent) of clearcut acreage is deducted from broadcast burning acreage on the assumption that most of the clearcut burning would be performed by loggers harvesting timber. Worker-days/acre estimated by Fire Ecologist, Oregon State Office.

3/ Estimated by regression equation on clearcut acres (x): $y = 13,648.48 + 1.1248\ x$, $r^2 = .99999$

4/ Sum of products of acres treated times worker-days per acre.

5/ Worker-days for decade converted to average annual number of jobs on basis of 250 work days per year.

GLOSSARY

GLOSSARY OF TERMS

Absorb - To be held within the structure of a substance.

Acre-foot - The volume of water that will cover 1 acre to a depth of 1 foot.

Allowable Cut - The amount of forest products that may be harvested annually or periodically from a specified area over a stated period in accordance with the objectives of management.

Allowable Cut Effect (ACE) - The immediate increase in today's allowable cut which is justified by expected future increases in yields due to present or proposed management treatments.

Allowable Cut Determination Process - A process which deals with the steps involved in the development and evaluation of alternative levels of timber production for the purpose of establishing an allowable cut.

Ambient - Surrounding, on all sides; for air, refers to any unconfined portion of the atmosphere.

Anadromous Fish - Fish which migrate from the sea to breed in fresh water. Their offspring return to the sea.

Aquifer - A geologic formation or structure that transmits water in sufficient quantity to supply the needs for a water development; usually saturated sands, gravel, fractures, and cavernous and vesicular rock. The term water-bearing is sometimes used synonymously with aquifer when a stratum furnishes water for a specific use.

Archeological Resources - All evidences of past human occupations other than historical documents, which can be used to reconstruct the lifeways of past peoples. These include sites, artifacts, environmental data and all other relevant information.

Aspect - The direction a slope faces.

Average Employment - The sum of number of employees, reported monthly, divided by twelve; because employment is reported for all employees working during any one month, it is a modest over-estimate of full-time equivalent employment.

Background - The area of a distance zone which lies beyond the foreground-middleground. Usually from a minimum of 3 to 5 miles to a maximum of about 15 miles from a travel route, use area, or other observer position. Atmospheric conditions in the SCCSYUs limits the maximum to about 12 miles.

Background Levels - Amounts of pollutants present from natural sources and from human disturbances which have reached equilibrium.

Bedload - The sediment that moves by sliding, rolling or bounding, on or very near, the streambed.

Biome - The largest land community unit (plant and animal) which is convenient to recognize.

Board Foot - A unit of solid wood, 1-foot square and 1-inch thick.

British Thermal Unit (BTU) - A unit of heat equal to 252 calories; quantity of heat needed to raise the temperature of one pound of water from 62^{o} F. to 63^{o} F.

Broadcast Burning - Intentional burning in which fire is intended to spread over all of a specific area. It may or may not qualify as prescribed burning.

Bucking - Cutting trees into log lengths.

Bureau Planning System - A process used in the BLM to establish land use allocations, constraints, and objectives for various categories of public land use.

Class I Streams - Waters classified by the State of Oregon as valuable for domestic use, important for recreation or significant for the reproduction of fishes.

Class II Streams - Waters designated by the State of Oregon as headwater streams or minor drainages that generally are of limited or no value for fishing or other forms of recreation.

Clearcutting - A method of timber harvesting in which all trees, merchantable or unmerchantable, are cut from an area.

Commercial Forest Land - Forest land that is now producing or is capable of producing at least 20 cubic feet per acre per year of commercial coniferous tree species.

Commercial Thinning - Partial cuttings made in merchantable stands (40-70 years old) in order to stimulate the growth of remaining trees and increase total yield from the stand.

Community Income Effect - The sum of direct and indirect personal income generated by a change, e.g., timber harvest. Indirect personal income results from economic activity stimulated in other local enterprises by purchase of goods and services, primarily of a support nature.

Constrained Timber Production Base - Base Acreage managed for timber production at a lesser intensity in consideration for other resource management objectives i.e. minimum harvest age of 350 years for wildlife habitat (see Intensive Timber Production Base).

Contrast - The effect of a striking difference in the form, line, color or texture of the landscape features within the area being viewed.

Contrast Rating - A method of determining the extent of visual impact for an existing or proposed activity that will modify any landscape feature (land and water form, vegetation and structures).

Coos Bay Wagon Road (CBWR) Lands - Public lands granted to the Southern Oregon Company and subsequently reconveyed to the United States.

Critical Habitat - That habitat considered by the Secretary of the Interior to be necessary to the normal needs or survival and recovery of listed Threatened or Endangered Species. It may also include habitat not currently occupied into which a listed species could expand.

Critical Viewpoint - The point(s) commonly in use or potentially in use where the view of a management activity is the most disclosing.

Cull - A tree or log which is rejected because it does not meet certain specifications.

Cultural Modification - Any man-caused change in the land or water form or vegetation or the addition of a structure which creates a visual contrast in the basic elements (form, line, color, texture) of the naturalistic character of a landscape.

Cultural Resources - Those fragile and nonrenewable remains of human activity occupation, or endeavor, reflected in districts, sites, structures, buildings, objects, artifacts, ruins, works of art, architecture, and natural features, that were of importance in human events. These resources consist of (1) physical remains, (2) areas where significant human events occurred--even though evidence of the event no longer remains, and (3) the environment immediately surrounding the actual resource. Cultural resources, including both prehistoric and historic remains, represent a part of the continuum of events from the earliest evidences of man to the present day.

Debris Torrent - Rapid movement of water-charged debris down a stream channel or gully. Debris torrents may often be triggered when naturally occurring debris dams break.

Discharge - Rate of flow of a fluid, the volume of fluid passing a point per unit of time, commonly expressed as cubic feet per second (cfs), million gallons per day, gallons per minute, or cubic meters per second.

Distance Zone - The area that can be seen as foreground-middleground, background, or seldom-seen.

Ecosystem - An ecological unit consisting of both living and nonliving components which interact to produce a natural, stable system.

Environmental Assessment (EA) - A systematic environmental analysis of site-specific BLM activities used to determine whether such activities have a significant affect on the quality of the human environment and whether a formal environmental statement is required.

Environmental Impact Statement (EIS) - A formal document to be filed with the Environmental Protection Agency that considers significant environmental impacts expected from implementation of a major Federal action.

Erosion (soil) - Removal of soil from its place of origin to a point of deposition other than a stream channel.

Fauna - All the animals in a given area.

Final Harvest Cut - Constitutes removal of a mature stand, either through clear cutting, the final stage of a shelterwood regime, or overstory removal.

Flora - All the plants in a given area.

Forbs - Herbaceous plants; most often used pertaining to herbaceous plants eaten by wildlife.

Foreground-middleground - In the SCCSYUs, the area visible from a travel route, use area, or other observer position to a distance of about 3 miles. The outer boundary of this zone is defined as the point where the texture and form of individual plants are no longer apparent in the landscape. Vegetation is apparent only in patterns or outline.

Forest Canopy - The more or less continuous cover of branches and foliage formed collectively by the crowns of adjacent trees and other woody growth.

Forest Land - Land that is now, or is capable of becoming, at least 10 percent stocked with forest trees and that has not been developed for nontimber use.

Forest Management Program - Includes timber activity plan and all forest resource related program activity plans.

Forest Type Island - An aggregation of trees occupying a specific area and sufficiently uniform in composition, age, arrangement and condition to be distinguishable from vegetation on adjoining areas.

Groundwater - Subsurface water in the zone of saturation.

Growing Stock - The amount of standing, green timber retained to produce forest products; also known as forest capital.

Habitat - The environment in which an organism occurs.

Intensive Forest Management Lands - All commercial forest land that is part of the timber production base for allowable cut calculation in the South Coast-Curry Sustained Yield Units.

High Lead Logging - A cable yarding system in which lead blocks are hung on a spar or tower to provide lift to the front end of logs giving partial suspension.

Historic Resources - All evidences of human activity that date from historic (i.e., recorded history) periods. These resources include documentary data (i.e., written records, archival material, photographs, maps, etc.), sites, artifacts, environmental data, and all other relevant information. Also included are loctions where documented historical events took place, even though no physical evidence of the events remain other than the setting. Historic resources are cultural resources and may be considered archeological resources when archeological work is involved in their identification and interpretation.

Igneous Rock - Rock formed from the cooling and solidification of molten rock.

Infiltration (soil) - Downward entry of water into the soil.

Intensive Timber Production Base - Base Acreage intensively managed for timber production using a 50 year minimum harvest age in the allowable cut computation.

Intermediate Cuttings - Any removal of merchantable trees from a stand prior to the final harvest cutting, i.e., commercial thinning, sanitation/salvage, or shelterwood regeneration cuttings.

Landing - Any place on or adjacent to the logging site where logs are assembled for further transport.

Landscape Character - The arrangement of a particular landscape as formed by the variety and intensity of the basic elements of form, line, color and texture. These factors give the area a distinctive quality which distinquishes it from its immediate surroundings.

Landscape Features - The land and water form, vegetation, and structures which compose the characteristic landscape.

Leach - Usually refers to the movement of chemicals through soil by water; may also refer to movement of herbicides out of leaves, stems or roots into the air or soil.

Log Flows - Destinations of harvested timber by origin. Origins used herein are management units and counties or county groupings; destinations are communities, counties or groupings of counties within which the primary processing of timber takes place.

Lumber and Wood Products, except Furniture - Defined by the Office of Management and Budget the Standard Industrial Classification Manual as Major Group #24, which includes logging contractors engaged in cutting timber and pulpwoods; merchant sawmills, lath mills, shingle mills, planing mills, plywood mills, and veneer mills engaged in producing lumber and wood basic materials; and establishments engaged in manufacturing finished articles made entirely or mainly of wood or wood substitutes. Certain types of establishments producing wood products are classified elsewhere, e.g., furniture and office and store fixtures are classified in Major Group #25.

Management Framework Plan (MFP) - Land use plan for public lands which provides a set of goals, objectives, and constraints for a specific planning area to guide the development of detailed plans for the management of each resource.

Mass Failure - See Mass Movement.

Mass Movement - Downslope movement of soil and rock caused by gravity; may be slow (creep) or rapid (landslide, debris avalanche).

Metamorphic Rock - Rock formed from preexisting rocks but changed by heat and/or pressure to rock with new physical, chemical and mineralogical properties.

Microclimate - The climatic condition of a small area modified from the general climatic conditions by local differences in elevation or exposure.

Minimum Harvest Age - The lowest age of a stand to be scheduled for final harvest.

Mixing Height - The height above the ground through which vertical mixing of air is relatively vigorous.

Mortality-Salvage - See sanitation/salvage cutting.

Multiple Use - Management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people.

National Register of Historic Places - The official list, established by the Historic Preservation Act of 1966, of the Nation's cultural resources worthy of preservation. The Register lists archeological, historic, and architectural properties (i.e., districts, sites, buildings, structures, and objects) nominated for their local, State, or national significance by State and/or Federal agencies and approved by the National Register staff. The Register is maintained by the Heritage Conservation and Recreation Service.

Non-commercial Forest Land - Land which is not capable of yielding at least 20 cubic feet of wood per acre per year from commercial species, or land which is capable of producing only non-commercial tree species.

Non-degradation Policy - Use of the highest and best practicable treatment and/or control of wastes, activities and flows to maintain water quality at the highest possible levels.

Non-forest Land - Land that has been developed for non-timber uses or land that is incapable of being 10 percent stocked with forest trees.

Non-point Source Pollution - Pollution caused by the introduction of materials from diffuse sources (e.g., sediment, nutrients), or from a natural or manmade alteration in the stream system.

O&C Lands - Public lands granted to the Oregon and California Railroad Company and subsequently revested to the United States.

Old-Growth Dependent - An animal species so adapted that it can exist only in old-growth forests.

Operations Inventory - An intensive forest inventory which provides managers with information showing the location, acreage, silvicultural needs, and mortality-salvage or thinning needs within each section of public land.

Paleontology - A science dealing with the life of past geological periods as known from fossil remains.

Partial Cutting - Tree removal other than by clearcutting.

Particulates - Finely divided solid or liquid particles in the air or in an emission; includes dust, smoke fumes, mist, spray and fog.

Peak Flow - The highest amount of stream or river flow occurring in a year or for a single storm event.

Perched Water Table - The surface of a local zone of saturation held above the main body of groundwater by an an impermeable layer or stratum, usually clay, and separated by the main body of ground water by an unsaturated zone.

Permeability (soil) - The quality of a soil horizon that enables water or air to move through it; may be limited by the presence of one nearly impermeable horizon even though the others are permeable.

Personal Income - the income received by all individuals in the economy from all sources; made up of wage and salary disbursements, proprietors income, rental income of persons, dividends, personal interest income, and the difference between transfer payments and personal contributions for social insurance.

Phytoplankton - Suspended, floating or weakly swimming microscopic aquatic plants.

Plankton - Organisms of relatively small size, mostly microcscopic, that either have relatively small powers of locomotion or drift in the water subject to the action of waves and currents.

Plant Community - An association of plants of various species found growing together in different areas with similar site characteristics.

Plantation Release - Any action taken on an established commercial timber stand to control stand composition and promote dominance and/or growth of suitable tree species. Treatments may include mechanical or manual slashing of undesirable brush and tree species, herbicide, biological, or a combination of methods. Forest fertilization is not considered a Release treatment.

Plantation Stocking Maintenance - Any vegetation management action taken on an unestablished stand to promote the survival and establishment of suitable trees. Treatments may include using biological, mechanical, or manual weeding, mulching, herbicide or a combination of methods.

Precommercial Thinning - Partial cuttings made in immature stands (10-25 years) in order to stimulate the growth of remaining trees by making available increased soil moisture, thereby increasing total yield from the stand.

Prehistoric - Pertaining to that period of time before written history. In North America, "prehistoric" usually refers to the pre-Columbian period.

Progeny Site - A test area for evaluating parent seed trees by comparing the performance of their offspring seedlings.

Protection - Any action taken to protect suitable trees from adverse elements such as weather, animals, insects, and disease. Treatments include all practices which increase chances for survival and normal growth of desired tree species.

Public Lands - Any land and interest in land owned by the United States within the several States and administered by the Secretary of the Interior

through the Bureau of Land Management. May include public domain, O&C or acquired lands in any combination.

Public Domain Lands - Original holdings of the United States never granted or conveyed to other jurisdictions.

Recharge - Process by which water is added to the zone of saturation, as in recharge of an aquifer.

Recreation Opportunity Setting - Combination of physical, biological, social, and managerial conditions that give value to a place.

Reforestation - Reestablishment of a tree crop on forest land.

Regeneration - The renewal of a commercial tree crop, whether by natural or artificial means; also, the young crop itself.

Regeneration Period - The time it takes for a new commercial timber stand to become stocked following the date of a timber sale.

Regulated Forest - A forest comprised of a desired (usually even) distribution of age classes or tree sizes, when the growth equals the cut (at the highest level sustainable) and when the level of growing stock remains relatively constant.

Relict - A remnant or fragment of a flora that remains from a former period when it was more widely distributed.

Riparian - Pertaining to natural communities which develop on or near the banks of a body of water.

Runoff - That part of precipitation, as well as any other flow contributions, which appears in surface streams, either perennial or intermittent.

Sanitation/Salvage Cutting - Removal of individual trees killed or injured by fire, insects, disease, etc., and the removal of those trees likely to die prior to final harvest cut so as to utilize merchantable material.

Sawlog - A log considered suitable in size and quality for producing sawn timber.

Scarcity (of Scenic Quality Values) - A scenic resource which is very rare or unique within a region, or may be somewhat more common but, because of its distinguishing characteristics, is unusually memorable.

Scenic Quality - The degree of harmony, contrast, and variety within a landscape.

Scenic Quality Class - The value (A, B, or C) assigned a scenic quality rating unit by applying the scenic quality evaluation key factors which

indicate the relative visual importance of the unit to the other units within the physiographic region in which it is located.

Scribner Log Rule - A log rule constructed from diagrams which shows the number of 1-inch boards which can be drawn in a circle representing the small end of a log; assumes a 1/4-inch saw kerf, makes a liberal allowance for slabs, and disregards taper.

Sediment Yield - The quantity of sediment, measured in dry weight or by volume, transported in water flowing through a stream cross-section in a given time. Consists of both suspended sediment and bedload.

Sedimentary Rock - A rock formed from materials deposited from suspension or precipitated from solution and usually more or less consolidated; e.g. sandstone, shale, limestone and conglomerates.

Seldom Seen - Portions of the landscape which are generally not visible from high and medium visual sensitivity level observer positions, and which are visible beyond approximately 15 miles from those positions.

Sensitivity - As applied to visual resource management, that degree of concern expressed by the user toward scenic quality and existing or proposed visual change in a particular characteristic landscape.

Seral Stage - The relatively transitory communities within a sere.

Sere - The whole series of communities which develop in a given situation.

Shelterwood Cutting - A series of partial cuttings designed to establish a new crop of trees under the protection of the old.

Silviculture - The art of producing and tending a forest.

Siphon - A pipe which uses atmospheric pressure to transfer water from one point to another against gravity.

Site Class - A measure of the relative productive capacity of an area for timber or other vegetation.

Site Preparation - Any action taken in conjunction with a reforestation effort (natural or artificial) to create an environment which is favorable for survival of suitable trees during the first growing season. This environment can be created by altering ground cover, soil or microsite conditions, using biological, mechanical, or manual clearing, prescribed burning, herbicide or a combination of methods

Slash - The branches, bark, tops, cull logs, and broken or uprooted trees left on the ground after logging has been completed.

Snag - A standing dead tree from which the leaves and most of the limbs have fallen.

Soil - The unconsolidated mineral and organic material on the immeditate surface of the earth that serves as a natural medium for the growth of land plants.

Soil Mapping Unit - A combination of soils, or miscellaneous land type or types that can be shown at the scale of mapping for the defined purposes of the survey; the basis for the delineations of a soil survey map.

Standard Industrial Classification (SIC) - An industrial classification system as defined by the Office of Management and Budget; defines industries in accordance with the composition and structure of the economy and covers the entire field of economic activity. Refer to lumber and wood products for an explanation of SIC 24.

State Historic Preservation Officer (SHPO) - The official within each State, authorized by the State at the request of the Secretary of the Interior, to act as a liaison for purposes of implementing the National Historic Preservation Act of 1966.

Subsurface Flow - Horizontal movement of water through the soil profile.

Succession - The orderly process of plant community change. Process by which one plant community will succeed another over time given the same climatic conditions.

Surplus Inventory - A temporary (1-3 decades) excess of growing stock over and above that which is necessary to sustain the even flow level.

Survival Cover - Cover required by animals to mitigate effects of a period of severe weather that cannot be met by thermal cover. The objective of survival cover is to provide a forest stand structure which will intercept snow during severe storms and provide significant quantities of forage in the same stand. Stand closure should be at least 75% or more.

Suspended Sediment - Sediment suspended in a fluid by the upward components of turbulent currents or by colloidal suspension.

Sustained Yield - The yield that a forest can produce continuously at a given intensity of management.

Teratogenicity - Ability of a substance to cause abnormal development of a fetus.

Texture (soil) - The relative proportion of sand, silt and clay (expressed as percentages) in a soil; grouped into standard classes and subclasses in the USDA Soil Survey Manual.

Thermal Cover - Cover used by animals to ameliorate effects of weather. For elk, a stand of conifer trees 40 feet or more tall with an average crown closure of 70% or more. For deer, cover may include saplings, shrubs or trees at least 5 feet tall with 75% crown cover.

Timber Production Base - Acres included in the calculation of the allowable cut (see high intensity forest management lands).

Timber Production Capability Classification (TPCC) - A classification system that identifies the commercial forest and base capable of producing timber on a sustained yield basis.

True Fir - A member of the genus Abies, e.g., white fir (Abies concolor). Douglas-fir (Pseudotsuga menziesii) is not a true fir.

Understory Species - Shade-tolerant plant species which characteristically grow beneath the forest canopy; e.g., blackberry and rhododenron.

Unit Resource Analysis (URA) - A BLM planning document which contains a comprehensive inventory and analysis of the resources within a specified geographic area and an analysis of their potential for development.

Vigil Quest Site - A rock circle located on a prominent peak visited by prehistoric people for spiritual reasons

Visit - The entry of any person into site or area of land or water generally recognized as providing outdoor recreation. Visits may occur either as recreation visits or as non-recreation visits.

Visitor-day - Twelve visitor-hours, which may be aggregated continuously, intermittently or simultaneously by one or more persons. Visitor-days may occur either as recreation visitor-days or as non-recreation visitor-days.

Visual Resource - The land, water, vegetation, animals and other features that are visible on all public lands (scenic values).

Visual Resource Management (VRM) - The planning, design and implementation of management objectives to provide acceptable levels of visual impacts for all BLM resource management activities.

Visual Resource Management Classes - The degree of alteration that is accept able within the characteristic landscape. Based upon the physical and sociological characteristics of any given homogeneous area and serves as a management objective.

Visual Sensitivity Level(s) - An index of the relative degree of user interest in scenic quality and concern and attitude for existing or proposed changes in the landscape features of an area in relation to other areas in the planning unit.

Volatilize - To evaporate; to change from a liquid to a gas.

VRM Class I - A visual resource management class designation with management objectives to provide primarily for natural ecological changes only. It

is applied to primitive areas, some natural areas, and other similar situations where management activities are to be restricted.

VRM Class II - A visual resource management class designation with management objectives specifying that changes in any of the basic elements (form, line, color, texture) caused by a management activity should not be evident in the characteristic landscape.

VRM Class III - A visual resource management class designation with objectives specifying that changes in the basic elements (form, line, color, texture) caused by a management activity may be evident in the characteristic landscape. However, the changes should remain subordinate to the visual strength of the existing character.

VRM Class IV - A visual resource management class designation with management objectives specifying that changes may subordinate the original composition and character but must reflect what could be a natural occurrence within the characteristic landscape.

Water Quality - The combined physical, chemical and biological characteristics of water bodies.

Watershed - The area drained by a given stream.

Yarding - The act or process of conveying logs to a landing.

is applied to primitive areas, some natural areas, and other similar situations where management activities are to be restricted.

VRM Class II - A visual resource management class designation with management objectives specifying that changes in any of the basic elements (form, line, color, texture) caused by a management activity should not be evident in the characteristic landscape.

VRM Class III - A visual resource management class designation with objectives specifying that changes in the basic elements (form, line, color, texture) caused by a management activity may be evident in the characteristic landscape. However, the changes should remain subordinate to the visual strength of the existing character.

VRM Class IV - A visual resource management class designation with management objectives specifying that changes may subordinate the original composition and character but must reflect what could be a natural occurrence within the characteristic landscape.

Water Quality - The combined physical, chemical and biological characteristics of water bodies.

Watershed - The area drained by a given stream.

Yarding - The act or process of conveying logs to a landing.

REFERENCES CITED

References Cited

Anderson, H.W., G.B. Coleman, and P.J. Zinke
1959. Summer Slides and Winter Scour . . . Dry-wet Erosion in Southern California Mountains. USDA For. Serv. Tech. Pap. PSW-36. Pacific Southwest For. and Range Exp. Stn. Berkley, Calif. In: USDA Forest Service. 1979. Effects of Fire on Soil, A State-of-Knowledge Review. National Fire Effects Workshop, Denver, Colo.

Bartonek, James C.
1979. Personal communication, Pacific Flyway Representative, U.S. Fish and Wildlife Service, Portland, Oreg.

Bassett, J.R., B.L. Driver, and R.M. Schreyer
1972. User Study: Characteristics and Attitude, Michigan's Au Sable River Prepared by Univ. of Michigan, School of Natural Resources, for Northeast Michigan Regional Planning and Development Commission, Rogers City, Mich.

Bassett, Patricia M.
1977. Timber Resources of Southwest Oregon. USDA Forest Service Resource Bull. PNW-72. Pacific Northwest Forest and Range Experiment Station, Portland, Oreg.

Beaton, C. Russell and Thomas H. Hibbard
1977. Douglas County Timber Supply Economic Impact Analysis, A Report to Douglas County Commissioners, John Truett, Chairman. Willamette University, Salem, Oreg.

Beuter, John H., K. Norman Johnson, and H. Lynn Scheurman
1976. Timber for Oregon's Tomorrow: An Analysis of Reasonably Possible Occurrences. Research Bulletin 19, Forest Research Lab, Oregon State University, Corvallis, Oreg.

Bollag, J.M., G.G. Briggs, J.E. Dawson and M. Alexander
1968. 2,4-D Metabolism, Enzymatic Degradation of Chlorocatechols. J. Agri. Food Chem. 16:829-833. Cited in: Literature Reviews of Four Selected Herbicides: 2,4-D, Dichlobenil, Diquat & Endothal. Ruth Shearer and Mark Halter, January 1980, Seattle, Wash.

Boutwell, R.K. and Dorothy K. Bosch
1959. The Tumor-Promoting Action of Phenol and Related Compounds for Mouse Skin. Cancer Research, 19, 413-424. Cited in: Literature Reviews of Four Selected Herbicides: 2,4-D, Dichlobenil, Diquat & Endothal. Ruth Shearer and Mark Halter, January 1980, Seattle, Wash.

Brown, George W.
1973. The Impact of Timber Harvest on Soil and Water Resources. Oregon State University Extension Bulletin No.827, Corvallis, Oreg.

_____ and J.T. Krygier
1967. Changing Water Temperatures in Small Mountain Streams. In: Gibbons, D.R. and E.O. Salo, 1973. J. Soil and Water Conserv. 22(6): 242-244.

_____
1970. Effects of Clearcutting on Stream Temperature. Water Resour. Res. 6(4): 1133-1139. In: Gibbons, D.R. and E.O. Salo. 1973. An Annotated Bibliography of the Effects of Logging on Fish of the Western United States and Canada. USDA For. Serv. Gen. Tech. Rep. PNW-10. Pac. Northwest For. and Range Exp. Stn., Portland, Oreg.

_____
1971. Clearcut Logging and Sediment Production in the Oregon Coast Range. Water Resources Research, National Symposium on Watersheds in Transition, Am. Water Resour. Assoc. Proc., pp. 1189-1199, Urbana, III. In: EPA 1973. Methods for Identifying and Evaluating the Nature and Extent of Non-point Sources of Pollutants. EPA, Washington, D.C.

Browning, M.R.
1975. The Distribution and Occurrence of the Birds of Jackson County, Oregon and Surrounding Areas. N. Am. Fauna, No. 70. U.S. Fish and Wildlife Service, Washington, D.C.

Bruce, David, Donald J. DeMars, and Donald L. Reukema
1977. Douglas-fir Managed Yield Simulator--D.F.I.T. User's Guide. USDA For. Serv. Gen. Tech. Rep. PNW-57. Pac. Northwest For. and Range Exp. Stn., Portland, Oreg.

Bunnell, F.L. and D.S. Eastman
1976. Effects of Forest Management Practices of Wildlife in the Forests of British Columbia. In: Int. Union of Forest Res. Organizations, 16th Congress, Vol.1, pp. 631-689, Oslo, Norway.

Burns, James W.
1971. The Carrying Capacity for Juvenile Salmonids in Some Northern California Streams. California Fish and Game, 57(1): 44-57

Burt, W.H. and R.P. Grossenheider
1964. A Field Guide to the Mammals. Houghton Mifflin Co., Boston, Mass.

Cameron, John J. and John W. Anderson
1977. Results of the Stream Monitoring Program Conducted During FY 1977. Herbicide Spray Project, Coos Bay District. USDI, BLM, Coos Bay Oreg.

Carls, E. Glen
1974. "The Effects of People and Man-Induced Conditions on Pref-for Outdoor Recreation Landscaped." Journal of Leisure Research Vol. 6 (spring). pp. 113-123.

Chilcote, William W., G.P. Juday, R.W. Fonda, J.O. Sawyer and A.M. Wiedemann
1976. A Survey of the Potential Natural Landmarks, Biotic Themes, of the North Pacific Border Region. A Report prepared for USDI National Park Service

Cook, Walter L., Jr.
1968. The Use of Special Clauses in Timber Contracts for the Protection of Aesthetic Values. Unpublished mimeo. College of Forestry, State University of New York, Syracuse, N.Y.

Coos County Assessor
1980. Personal communcation, April 17.

Coos County Treasurer
1980. Personal communication, April 17.

Coos-Curry-Douglas Economic Improvement Association
1978. Projections of Future Job Losses in the Timber Industry in the CCD District Due to Timber Supply Declines and Productivity Increases. Roseburg, Oreg.

———
1979. Comprehensive Economic Development Strategy, 1978-80 Action Program for the CCD Economic Development District, Roseburg, Oreg.

Courtney, K. Diane
1975. Evaluation of Herbicides by the Prenatal Development Index. Presented in part at the 15th Annual Meeting of the Teratology Society, May 11-14, 1975, Penna.

Crouch, G.L.
1974. Interaction of Deer and Forest Succession on Clearcuttings in the Coast Range of Oregon. In: Black, H.C. (ed.). 1974. Wildlife and Forest Management in the Pacific Northwest, pp.133-138. School of Forestry, Oregon State University, Corvallis, Oreg.

Dall, Willaim H.
1909. The Miocene of Astoria and Coos Bay, Oregon: U.S. Geol. Survey Prof. Paper 59.

Ditton, R. and T. Goodale
1972. Marine Recreation Uses of Green Bay: A Study of Human Behavior and Attitude Patterns, Tech. Rep. No. 17. Sea Grant Program, University of Wisconsin, Madison, Wis.

Dost, Frank V.
1978a. Toxicology of Phenoxy Herbicides and Hazard Assessment, Their Use in Reforestation. Cal. Pac. Region, USDA, For Serv. Publication.

_____
1978b. Toxicology of Phenoxy Herbicides and 2,3,7,8 - Tetrachlorodibenzo-p-Dioxin. Department of Agricultural Chemistry and Environmental Health Sciences Center, Oregon State University, Corvallis, Oreg.

Douglas, William O.
1965. A Wilderness Bill of Rights. Little, Brown, and Company; Boston, Mass.

Driver, B.L.
1975. Quantification of Outdoor Recreationists' Preferences. In: Research Camping and Environmental Education. Pennsylvania State University, HPER Ser. 11, University Park, Pa.

Dyrness, C.T., C.T. Youngberg, and Robert H. Ruth
1957a. Some Effects of Logging and Slash Burning on Physical Soil Properties in the Corvallis Watershed. USDA For. Serv. Res. Pap. PNW-19, Pac. Northwest For. and Range Exp. Stn., Portland, Oregon. In: USDA, Forest Service. 1979. Effects of Fire on Soil, A State-of-Knowledge Review. National Fire Effects Workshop, Denver, Colo.

_____
1957b. Some Effects of Logging and Slash Burning on Physical Soil Properties in the Corvallis Watershed. USDA For. Serv., Res. Pap. PNW-14. Pac. Northwest For. and Range Exp. Stn., Portland, Oreg. In: U.S. EPA. 1976. Forest Harvest, Residue Treatment, Reforestation, and Protection of Water Quality. Prepared under contract by James M. Montgomery, Consulting Engineers, Inc. for EPA Region X, Seattle, Wash.

Duprey, R.L.
1968. Compilation of Air Pollutant Emmission Factors, U.S. Dept. Health, Educ. and Welfare. Public Health Serv. Publ. 999-AP-42. Cited in: Forest Fuels, Prescribed Fire, and Air Quality. J. Alfred Hall, USDA, For. Serv. PNW Forest and Range Experiment Station, Portland, Oreg.

Easterbrook, Don J. and Susan L. Marsh
1978. Potential Geologic Natural Landmarks - Northern Pacific Border Province. Western Washington University, Bellingham, Wash.

Edgerton, Paul J.
1972. Big Game Use and Habitat Changes in a Recently Logged Mixed Conifer Forest in Northeastern Oregon. Proc. 52nd Annu. Conf. of West. Assoc. of State Fish and Game Comm., Portland, Oreg.

_____ and Burt R. McConnell
1976. Duirnol Temperature Regimes of Logged and Unlogged mixed Conifer Stands on Elk Summer Range. USDA Forest Service Research Note PNW-277. USDA Forest Service, Portland, Oreg.

Epstein, Samual S.
1970. A Family Likeness. Environment 12, 16-25. Cited in: Literature Reviews of Four Selected Herbicides: 2,4-D, Dichlobenil, Diquat and Endothal. Ruth Shearer and Mark Halter, January 1980, Seattle, Wash.

Erman, Don C., J.D. Newbold and K.B.Roby
1977. Evaluation of Streamside Bufferstrips for Protecting Aquatic Organisms. Contribution No. 165. California Water Resources Center. University of California, Davis, Calif.

Eschner, A.R. and J. Larmoyeux
1963. Logging and Trout: Four Experimental Forest Practices and Their Effect on Water Quality Programs. Fish - Cult. 25(2): 59-67. In: Gibbons, D.R. and E.O. Salo. 1973.

Faust, S.D. and O.M. Aly
1963. Some Effects of 2,4-D and 2,4-DCP on Drinking Water Quality. Proc. Northwest Weed Cont. Conf. 17:460-470. Cited in: Literature Reviews of Four Selected Herbicides: 2,4-D, Dichlobenil, Diquat & Enclothal. Ruth Shearer and Mark Halter, January 1980, Seattle, Wash.

Fitzgerald, Paul
1976. A Social Analysis of the Coos Bay District. Western Interstate Commission for Higher Education, Boulder, Colo.

Franklin, Jerry F. and C.T. Dyrness
1973. Natural Vegetation of Oregon and Washington. USDA For. Serv. Gen. Tech. Rep. PNW-8. Pac. Northwest For. and Range Exp. Stn., Portland, Oreg.

Franklin, Jerry F., F.C. Hall, C.T. Dyrness and C. Maser
1972. Federal Research Natural Areas in Oregon and Washington - A guidebook for Scientists and Educators. USDA, Forest Service, Pacific Northwest Forest and Range Experiment Station, Portland, Oreg.

Franzreb, Kathleen E. and Robert D. Ohmart
1978. The Effects of Timber Harvesting on Breeding Birds in a Mixed Coniferous Forest, Condor 80:431-441.

Fredriksen, R.L.
1970. Erosion and Sedimentation Following Road Construction and Timber Harvest on Unstable Soils in Three Small Western Oregon Watersheds. USDA For. Serv. Res. Pap. PNW-104. Pac. Northwest For. and Range Exp. Stn., Portland, Oreg.

_____
1971. Impact of Forest Management on Stream Water Quality in Western Oregon. In: Pollution Abatement and Control in the Forest Products Industry, 1971-72 Proceedings, USDA, For. Serv.

_____ and R.D. Harr
1979. Soil, Vegetation and Watershed Management of the Douglas-Fir Region. In: Forest Soils of the Douglas-Fir Region. Northwest Forest Soils Council; Washington State Cooperative Extension Service, Washington State University, Pullman, Wash.

Fritschen, Bovee, Beuttner, Charlson, Monteith, Pickford, Murphy and Darley
1970. Slash Fire Atmospheric Pollution. USDA For. Serv. Res. Pap. PNW-97. Pac. Northwest For. and Range Exp. Stn., Portland, Oreg.

Gabrielson, Ira N. and Stanely G. Jewett
1940. Birds of Oregon. Oregon State College, Corvallis, Oreg.

Gerstle, R.W. and D.A. Kemnitz
1967. Atmospheric Emmissions from Open Burning. J. Air Pollut. Contr. Ass. 17(5):324-327. Cited in: Forest Fuels, Prescribed Fire, and Air Quality. J. Alfred Hall, USDA, Forest Service, PNW Forest and Range Experiment Station, Portland, Oreg.

Gibbons, D.R. and E.O. Salo
1973. An Annotated Bibliography of the Effects of Logging on Fish of the Western U.S. and Canada. USDA For. Serv. Gen. Tech. Rep. PNW-10, Pac, Northwest For. and Range Exp. Stn., Portland, Oreg.

Gratkowski, H.
1974. Herbicidal Drift Control: Aerial Spray Equipment, Formulations, and Supervision. USDA For. Serv. Gen. Tech. Rep. PNW-14. Pac. Northwest For. and Range Exp. Stn., Portland, Oreg.

_____ and P. Lauterback
1974. Releasing Douglas-firs from Varnishleaf Ceanothus. J. For. 72(3):150.

Gray, J.R.A. and J.M. Edington
1969. Effect of Woodland Clearance on Stream Temperature. J. Fish Res. Board of Canada 26:399-403. In: Gibbons, D.R. and E.O. Salo. 1973.

Gyrd - Hansen, N. and Sv. Dalgaard - Mikkelsen
1974. The Effect of Phenoxy-herbicides on the Hatchability of Eggs and the Viability of the Chicks. Acta Pharmacol. et Toxicol. 35: 300-308

Hall, Alfred J.
1972. Forest Fuels Prescribed Fire and Air Quality. USDA, For. Service, Pacific Northwest Forest and Range Experiment Station, Portland, Oreg.

Hall, James D., and Richard Lantz
1969. Effects of Logging on the Habitat of Coho Salmon and Cut-throat Trout in Coastal Streams. Cited in: The Impact of Timber Harvest on Soil and Water Resources, George W. Brown. Extension Bulletin 827, Oregon State University Extension Service, Corvallis, Oreg.

Hansen, W.H., M.L. Quaife, R.T. Habermann and O.G. Fitzhugh
1971. Chronix Toxicity of 2,4-D in Rats and Dogs. Toxicol. and Appl. Pharm. 20: 111-129.

Harper, James A.
1969. Relations of Elk to Reforestation in the Pacific Northwest. In: Wildlife and Reforestation in the Pacific Northwest. Proc. of a Symposium held September 12-13, 1968, pp. 67-71. Oregon State University, Corvallis, Oreg.

_____
1980. Personal communication, Assistant Chief, Wildlife Division, Oregon Department of Fish and Wildlife, Portland, Oreg.

Harr, R. Dennis, Richard L. Fredricksen, and Jack Rothacher
1979. Changes in Streamflow Following Timber Harvest in Southwestern Oregon. USDA For. Serv. Res. Pap. PNW-249 Portland, Oreg.

Harris, Tiff
1979. Public Perceptions of Federal Land Use Decision-making in Oregon: Results of a State-Wide Survey, Federal Land Use Policy Project. Oregon State University, Corvallis, Oreg.

Hartung, R.
1965. Effects of Oiling on Reproduction of Ducks. J. Wildl. Mgmt. 29(5): pp. 872-874.

_____
1966. Toxicity of Some Oils to Waterfowl. J. Wildl. Mgmt. 30(3): pp. 564-570.

Hendee, John C., William Catton, and Richard P. Gale
1971. Typology of Outdoor Recreation Activity Preferences. J. Environ. Educ. 3(1): pp. 28-34.

Himel, James H., Rudolph H. Moyer and Jonathan D. Cook
1978. Forestry Burning Emissions and Potential Air Quality Impacts in the Pacific Northwest. Geomet, Incorporated, Gaithersburg, Md.

Holcombe, G. and G. Phipps
1979. Toxicity of Four Phenols Tested. EPA Quarterly Report, Environmental Research Laboratory - Duluth. Jan-Mar. 1979. Cited in: Literature Reviews of Four Selected Herbicides: 2,4-D, Dichlobenil, Diquat & Enclothal. Ruth Shearer and Mark Halter, January 1980, Seattle, Wash.

Howard, James O. and Bruce A. Hiserote
1978. Oregon's Forest Products Industry 1976. PNW Forest and Range Experiment Station, USDA, Forest Service, Portland, Oreg.

Howe, Henry V.
1922. Faunal and Stratigraphic Relationships of the Empire Formation, Coos Bay, Oregon. Calif. Univ. Dept. Geol. Sci. Bull., Vol. 14, No. 3,22.

Ingles, Lloyd G.
1965. Mammals of the Pacific States. Stanford University Press, Stanford, Calif.

Journal of Forestry
1968. Public Use of Forest Wildlife: Quantity and Quality Considerations. Vol. 66(2): pp.106-110.

Ketcheson, Gary and Henry A. Froehlich
1977. Hydrologic Factors and Environmental Impacts of Mass Movements in the Oregon Coast Range. Water Resources Research Institute, Oregon State University, Corvallis, Oreg.

Knopf, R.C.
1972. Motivational Determinants of Recreation Behavior. Unpublished Master's Thesis, University of Mich., School of Natural Resources, Ann Arbor, Mich. University Microfilms No. M-4244, 268.

Langenau, E.E., Jr., G.E. Burgoyne, Jr. and G.M. Bragdon
1977. Field Interviews of Firearm Deer Hunters Using Experimental Clearcuttings. Michigan Dept. of Natural Resources, Wildlife Division Report No. 2776.

Langenau, E.E., Jr. and G.C. Jamsen
1975. A Preliminary Report on the Attitudes of Firearm Deer Hunters Towards Experimental Clearcutting. Michigan Dept. of Nat. Resour., Wildlife Div. Rep. No. 2744.

Levine, Ralph L. and Edward E. Langenau Jr.
1979. Attitudes Towards Clearcutting and Their Relationships to the Patterning and Diversity of Forest Recreation Activities. Forest Science, Vol. 25, No.2.

Lloyd, J.D. Jr.
1978. 1976 Oregon Timber Harvest. PNW Range and Experiment Station, USDA, Forest Service, Portland, Oreg.

Lutz - Ostertag, Y. and H. Lutz
1970. Action nefaste de l'herbicide 2,4-D sur le developpement embryonnaire et la fecondite du gibier a plumes. Compt. Rend. Acad. Sci. Paris 271 (Series D), 2418-2421. Cited in: N. Gyrd Hansen and Sv. Dalgaard - Mikkelsen (1974) and J. Somers et al. (1974a), q.v.

Lyon, L. Jack
1979. Habitat Effectiveness for Elk as Influenced by Roads and Cover. Journal of Forestry, October 1979.

Marshall, Robert
1925. Recreational Limitations to Silviculture in the Andirondacks. J. For. 23(2): pp. 173-177.

Maser, Chris, Bruce R. Mate, Jerry F. Franklin, and C. Ted Dyrness
n.d. Natural History of Oregon Coast Mammals. Draft mimeo.

Megahan, Walter F.
1972. Logging, Erosion, Sedimentation - Are they Dirty Words? J. For. 70(7): pp. 403-407.

Mersereau, R.C. and C.T. Dyrness
1972. Accelerated Mass Wasting after Logging and Slash Burning in Western Oregon. J. Soil and Water Consers. 27(3): 112-114. Cited in: Effects of Fire on Soil. Gen. Tech. Report WO-7, USDA, Forest Service, Denver, Colo.

Meslow, E. Charles
1977. The Relationship of Birds to Habitat Structure - Plant Communities and Successional Stages. In: DeGraaf, Richard M. 1978. Proc. of the Workshop on Nongame Bird Habitat Management in the Coniferous Forests of the Western U.S., USDA, For. Serv. Gen. Tech. Rep. PNW-64. Pac. Northwest For. and Range Exp. Stn., Portland, Oreg.

Methven, Ian R.
1974. Development of a Numerical Index to Quantify the Aesthetic Impact of Forest Management Practices. Information Report PS-X-51. Environment Canada-Forestry Service, Petawawa Forest Exp. Stn., Chalk River, Ontario, Canada.

Moore, Duane
1975a. Effects of Forest Fertilization with Urea--Quilcene Ranger District, Washington. PNW Forest and Range Experiment Station, Portland, Oreg.

_____
1975b. Impacts of Forest Fertilization on Water Quality in the Douglas-Fir Region-- A Summary of Monitoring Studies. PNW Forest and Range Experiment Station, USDA, Forest Service, Corvallis, Oreg.

Moring, J.R. and R.C. Lanz
1974. Immediate Effects of Logging on the Freshwater Environment of Salmonoids. Oreg. Wildlife Comm. Res. Div., Project AFS-5-8, Final Report.

Morris, William G.
1970. Effects of Slash Burning in Over Mature Stands of Douglas-fir Region. Forest Sci. 16: 258-270.

Nature Conservancy, Oregon Natural Heritage Program
1977. Oregon Natural Areas - Western Oregon. Data summary prepared under contract with the Land Conservation and Development Commission, Portland, Oreg.

Norris, Logan A.
1975. Behavior and Impact of Some Herbicides in the Forest. PNW Forest and Range Experiment Station, Forestry Sciences Laboratory, Corvallis, Oreg.

Oregon Department of Energy
1980. Oregon's Energy Future, Fourth Annual Report (January 1,1980) Salem, Oreg.

Oregon Department of Environmental Quality
1976. Air Quality Profile and Evaluation for Southwest Oregon Intrastate Air Quality Control Region. Air Qual. Control Div., Portland, Oreg.

_____
1977. Oregon Air Quality Report-1977. Air Qual. Control Div., Portland, Oreg.

_____
1978a. Oregon Air Quality Report. Air Quality Control Division, Portland, Oreg.

_____
1978b. Oregon's Statewide Assessment of Nonpoint Source Problems. Water Qual. Program, Portland, Oreg.

Oregon Department of Forestry and National Weather Service
1979. Annual Report, 1978 Oregon Smoke Management Plan; OSDF, Forest Protection Division; and NWS, Fire Weather Office; Salem, Oreg.

Oregon Department of Geology and Minerals Industries
1975. Environmental Geology of Western Coos and Douglas Counties, Oregon. R.E. Corcoran, State Geologist, Bulletin 87, Salem, Oreg.

Oregon Department of Human Resources, Employment Division
1973-1980. Oregon Resident Labor Force, unemployment and employment (annual publication published in year following year covered). Salem, Oreg.

_____ 1977. Labor Force, Employment and Unemployment (by County) 1976. Salem, Oreg.

_____ 1978. Labor Force, Employment and Unemployment (by County) 1977. Employment Division, Salem, Oreg.

_____ 1979. Labor Force, Employment and Unemployment (by County) 1978. Employment Division, Salem, Oreg.

_____ 1980. Errol Pederson, personal communication. Employment Division, Salem, Oreg.

_____ 1980b, Oregon Property Tax Statistics, 1978, 1979. Salem, Oreg.

Oregon Department of Revenue
1980. Richard Yates, personal communication. Salem, Oreg.

Oregon Department of Transportation
1972. Supplements and Revisions to Oregon Outdoor Recreation Plan. Demand section, pp. 7,10. Parks and Recreation Branch, Salem, Oreg.

_____ 1975. Oregon Recreation Demand Bulletin. Technical Document 1 of the Statewide Comprehensive Outdoor Recreation Plan, Parks and Recreation Branch, Salem, Oreg., September 1975.

_____ 1978. Oregon Outdoor Recreation Plan 1978, Review Draft. State Parks and Recreation Branch, Salem, Oreg.

Oregon Water Resources Department
1978. Water Resources Investigations in Oregon, 1977. In cooperation with U.S. Geological Survey, Portland, Oreg.

Pacific Northwest River Basins Commission
1970. Columbia-North Pacific Comprehensive Framework Study of Water and Related Lands. Water Resources, Appendix 5, Vol. 2, Vancouver, Wash.

Peterson, Roger T.
1961. A Field Guide to Western Birds. Houghton-Mifflin Co.,Boston, Mass.

Phillips, Robert W.
1971. Effects of Sediment on the Gravel Environment and Fish Production. In: Forest Land Uses and Stream Envirornment, Proc. of a Symposium, Oregon State University, Corvallis, Oreg.

Portland State University
1976. State of Oregon, Population Projections for Oregon and its Counties, 1975-2000. Population Bulletin, CPRC Series P-2 #2, Center for Population Research and Census, Portland, Oreg.

_____
1980. Population Estimates: Oregon Counties and Incorporated Cities, July 1, 1970. Center for Population Research and Census, Portland, Oreg.

Reynolds, Richard T.
1971. Nest-site Selection of the Three Species of Accipiter Hawks in Oregon. Proc. Fish Wildl. Habitat Manag. Training Conf. USFS Training Conf., Eugene, Oreg. In: Literature Review of Twenty- Three selected Forest Birds.

Rice, R.M. and S.A. Sherbin
1977. Estimating Sedimentation from an Erosion Hazard Rating. PSW Forest and Range Experiment Station, Berkeley, Calif.

Robbins, Chandler S., Bertel Bruun, and Herbert S. Zim
1966. Birds of North America. Golden Press, New York.

Schulze, J.A., D.B. Manigold and F.L. Andrews
1973. Pesticides in Selected Western Streams - 1968-1971. Pestic. Monit. J. 707:73-84. Cited in: Literature Reviews of Four Selected Herbicides: 2,4-D, Dichlobenil, Diquat & Endothal. Ruth Shearer and Mark Halter, January 1980, Seattle, Wash.

Smith, David M.
1962. The Practice of Silviculture, 7th Edition. John Wiley and Sons, New York.

Somers, J., E.T. Moran, Jr., B.S. Reinhart and G.R. Stephenson
1974. Effects of External Application of Pesticides to the Fertile Egg on Hatching Success and Early Chick Performance. 1. Pre-Incu- bation Spraying with DDT and Commercial Mixtures of 2,4-5: Picloram and 2,4-D: 2,4,5-T. Bull. Environ. Contam. And Toxicol. 11(1): 33-38.

Somers, J., E.T. Moran, Jr., B.S. Reinahrt
1974. Effects of External Application of Pesticides to the Fertile Egg on Hatching Success and Early Chick Performance. 2. Commercial Herbicide Mixtures of 2,4-D with Picloram or 2,4,5-T Using the Pheasant. Bull. Environ. Contam. and Toxicol. 11(4): 339-342.

Steere, Margaret L.
1955. Fossil Localities in Coos Bay Area, Oregon, The Ore Ben 17(6): 39-43 (M.L. Steere, Editor), Bulletin 92, State of Oregon, Department of Geology and Mineral Industries, Portland, Oreg.

Stevens, Joe B.
1966. Angler Success as a Quality Determinant of Sport Fishery Recreational Values. Trans. of the Am. Fish. Soc. 95(4): 357-362.

_____
1976. The Oregon Wood Products Labor Force: Job Rationing and Worker Adaptations in a Declining Industry. Oregon State University, Dept. of Ag. and Resour. Econ., Corvallis, Oreg.

Swanson, D.O.
1970. Roosevelt Elk - Forestry Relationships in the Douglas-fir Region of the Southern Oregon Coast Range. Ph.D. Thesis, Univ., of Michigan, Ann Arbor, Mich.

Swanson, F.J. and C.T. Dyrness
1975. Impact of Clear-Cutting and Road Construction on Soil Erosion by Landsides in the Western Cascade Range, Oregon. In: Geology 3(7): 393-396, July 1975 by USDA, Forest Service.

Thomas, Jack W.
1979. Wildlife Habitats in Managed Forest of the Blue Mountains of Oregon and Washington. Agriculture Handbook No. 553, USDA, Forest Service.

Townsend, Martin A., James A. Pomerening, Byron R. Thomas
1977. Soil Inventory of the Coos Bay District. USDI, BLM, Coos Bay District, Coos Bay, Oreg.

Tucker, Richard K. and D. Glen Crabtree
1970. Handbook of Toxicity of Pesticides in Wildlife. USDI, Fish and Wildlife Serv., Res. Publ. No. 84.

U.S. Department of Agriculture, Forest Service
1974. The Outlook for Timber in the United States. FRR-20.

_____
n.d. Animal Damage Control Handbook FSH 2609 22, Region 6.

U.S. Department of Agriculture, Soil Conservation Service
1974. Technical Note, Cons. Agri. No. 32

_____
1976. Technical Note, USLE Oregon

_____
1977. Technical Note, Agronomy, No. 37

_____
1977. Technical Note, Woodland, No. 10

_____
1978. Technical Note, Woodland, No. 12

U.S. Department of Commerce, Bureau of Census
1971. 1970 Census of Population, General Population Characteristics - Oregon.

U.S. Department of Commerce, Bureau of Economic Analysis
1979. Regional Economic Information System (REIS). Regional Economics Divison.

_____
1980. Regional Economic Information System (REIS). Oregon Portion. Regional Economics Division.

U.S. Department of Energy, Bonneville Power Administration
1979. Oregon Population, Employment and Households Projected to 2000. Branch of Power Resources, Portland, Oreg.

U.S. Department of the Interior, Geological Survey
1978. Water Resources Data for Oregon, Water Year 1977. Report OR-7701, Water Resources Div., Portland, Oreg.

U.S. Department of the Interior, Bureau of Land Management
1959. Forest Engineering Handbook. Oregon State Office, Portland, Oreg.

_____
1975. Timber Management Final Environmental Impact Statement. Washington, D.C.

_____ 1978a. Josephine Sustained Yield Unit Ten-Year Timber Management Plan Final Environmental Impact Statement, Oregon State Office, Portland, Oreg.

_____ 1978b. Social Economic Data System - Dynamic Regional AnalysisModel (DYRAM). Applications by the Oregon State Office, Portland, Oreg.

_____ 1978c. South Coast Curry Planning Area Analysis (unpublished report). Coos Bay District Office, Coos Bay, Oreg.

_____ 1978d. Vegetation Management with Herbicides - Western Oregon. Final Environmental Statement. Oregon State Office, Portland, Oreg.

_____ 1979a. BLM Facts - Oregon and Washington, 1978. Oregon State Office, Portland, Oreg.

_____ 1979b. Jackson-Klamath Final Environmental Impact Statement, Oregon State Office, Portland, Oreg.

_____ 1980. BLM Facts - Oregon and Washington, 1979. Oregon State Office, Portland, Oregon.

_____ n.d. Manual 8400, Visual Resource Management. Washington, D.C.

_____ n.d. Manual 8100, Cultural Resource Management. Washington, D.C.

_____ Forthcoming. Operations Inventory Handbook. Oregon State Office, Portland, Oreg.

U.S. Environmental Protection Agency
1973. Methods for Identifying and Evaluating the Nature and Extent of Non-Point Sources of Pollutants. EPA 430/9-73-014, Office of Air and Water Programs, Washington, D.C.

_____ 1975. Logging Roads and the Protection of Water Quality. EPA, Region X, Seattle, Washington.

_____
1977. Silvicultural Chemicals and Protection of Water Quality. U.S. EPA Region X, Seattle, Wash.

_____
1978. Impact of Forestry Burning upon Air Quality. Final draft report prepared by GEOMET, Inc. for U.S. EPA, Gaithersburg, Md.

_____
1980. 2,4-D Fact Sheet. Region X, Pesticide and Toxic Substance Branch, Seattle, Wash.

Weaver, Charles E.
1942. Paleontology of the Marine Tertiary Formations of Oregon and Washington: Wash. Univ. Pub. in Geol., V-5, pts. 1-3.

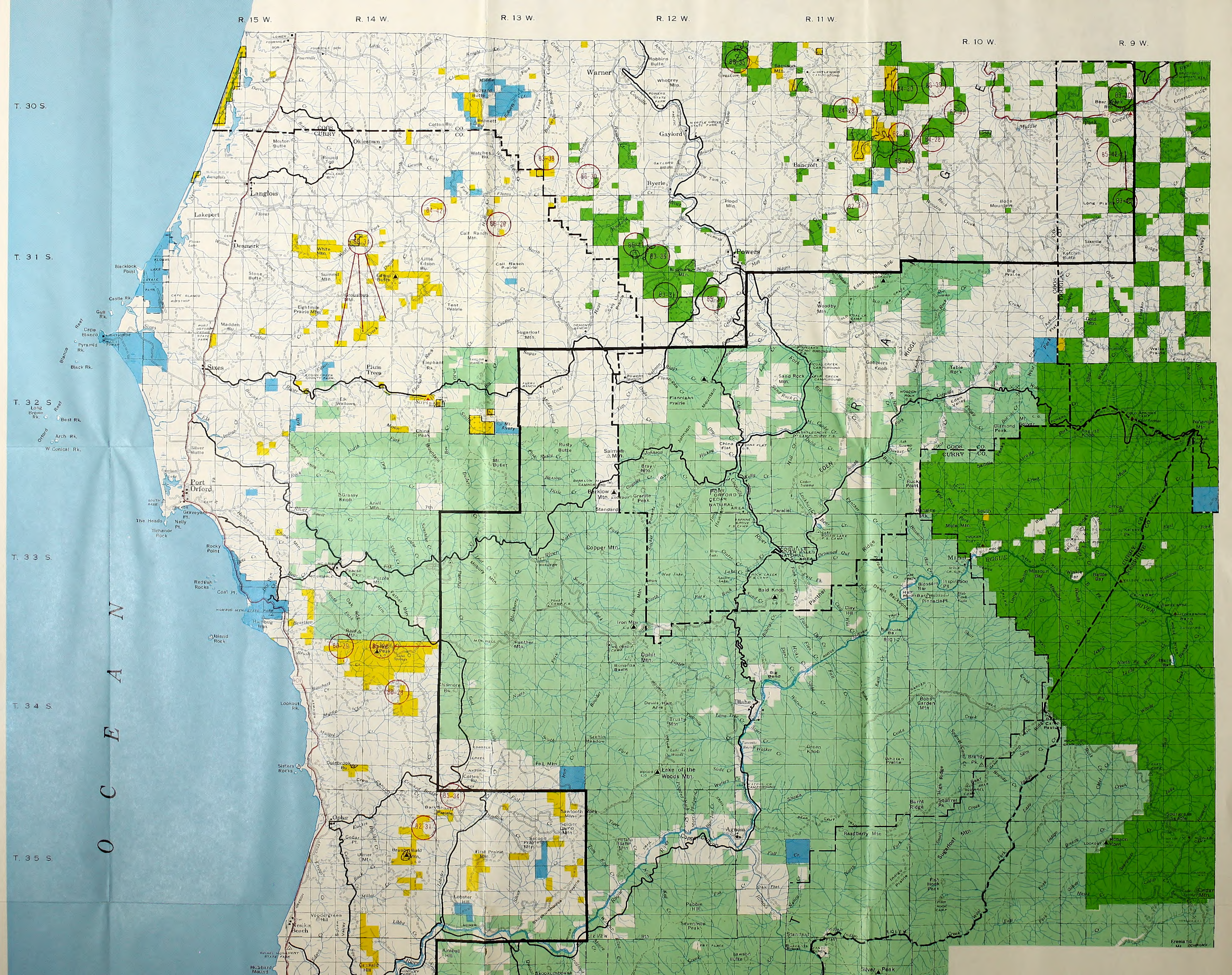
_____
1945. Stratigraphy and Paleontology of the Tertiary Formations at Coos Bay, Oregon: Wash. Univ. Pub. in Geol., V.6, No. 2.

Wight, Howard M.
1974. Non-game Wildlife and Forest Management. In: Hugh C. Black, Editor, Wildlife and Forest Management in the Pacific Northwest. Proceeding of a Symposium. Forest Research Laboratory, School of Forestry, Oregon State University, Corvallis, Oreg.

Wildesen, Leslie
1977. Analysis of Project-Related Impacts on Archeological Resources. Unpublished paper, USDA For. Serv., Region 6, Portland, Oreg.

INDEX

Index



R. 15 W.
R. 14 W.
R. 13 W.
R. 12 W.
R. 11 W.
R. 10 W.
R. 9 W.
T. 30 S.
T. 31 S.
T. 32 S.
T. 33 S.
T. 34 S.
T. 35 S.
O C E A N
Warner
Gaylord
Bancroft
Byerle
Powers
Langlois
Lakeport
Denmark
Okietown
COOS CO.
CURRY CO.
Sixes
Plum Trees
Port Orford
Agness
Illahe
Ophir
Copper Mtn.
Iron Mtn.
Ophir Mtn.
Bald Knob
Lake of the Woods Mtn.
Green Knob
Brandy Pk.
Bray Mtn.
Barklow Mtn.
Salmon Mtn.
Rusty Butte
Mt. Butler
Anvil Mtn.
Grassy Knob
White Mtn.
Cape Blanco
Blanco Reef
Pyramid Rk.
Black Rk.
Castle Rk.
Gull Rk.
Long Brown Rk.
Best Rk.
Orford Reef
Arch Rk.
W. Conical Rk.
Silver Butte
The Heads
Nelly Pt.
Tichenor Rock
Rocky Point
Redfish Rocks
Coal Pt.
Humbug Mtn.
Island Rock
Lookout Rk.
Sisters Rocks
Hubbard Mound
Sawtooth Mtn.
Lobster Hill
First Prairie Mtn.
Panther Mtn.
Fall Mtn.
Colton Bu.
Lone Prairie
Sixmile
Ketchum Butte
Bear Creek
Elephant Rk.
Mt. Avery
China Peak
Granite Peak
Table Rock
Mt. Bolivar
Diamond Peak
Nickel Mtn.
Mule Mtn.
Masoun Bar
Blossom Bar
Pinnacle Pt.
Inspiration Pt.
Bobs Garden Mtn.
Burnt Ridge
Saddle Pk.
Sugarloaf Mtn.
Hard Rock
Raspberry Mtn.
Fish Hook Peak
Freeland Mt.
Pebble Hill
Sevenmile Peak
Lawson Butte
Silver Peak
Vogelgreen Hill
Kimball Hill
Skookumhouse
Oak Flat
Standard
ROGUE
RIVER
EDEN

U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
COOS BAY DISTRICT

SOUTH COAST AND CURRY SUSTAINED YIELD UNITS SOUTH HALF

1980
Scale

0 1/2 1 2 3 4 5 6 MILE
0 1 2 3 4 5 6 7 8 9 10 KM

Figure I-1

LOCATION MAP

LEGEND

INTENSIVE FOREST MANAGEMENT LANDS
- O&C Lands BLM
- Public Domain BLM

OTHER BLM ADMINISTERED LANDS

U.S FOREST SERVICE LANDS

STATE LANDS

- U.S Interstate Highway
- U.S. Highway
- State Highway
- Major Routes of Public Use
- All Weather Road
- Seasonal Road
- Trail
- Railroad
- County Boundary
- SYU Boundary

- Recreation Area BLM
- Recreation Area Other
- Mine or Quarry
- Church
- School
- Timber Sale by Year (App. B)

☆GPO 1980 699-357

U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
COOS BAY DISTRICT

SOUTH COAST AND CURRY SUSTAINED YIELD UNITS NORTH HALF

1980
Scale

0 1/2 1 2 3 4 5 6 MILE
0 1 2 3 4 5 6 7 8 9 10 KM

Figure 1-1

LOCATION MAP

LEGEND

INTENSIVE FOREST MANAGEMENT LANDS
- O & C Lands BLM
- Public Domain BLM
- Coos Bay Wagon Road Lands BLM

OTHER BLM ADMINISTERED LANDS

U.S. FOREST SERVICE LANDS

STATE LANDS

- U.S. Interstate Highway
- U.S. Highway
- State Highway
- Major Routes of Public Use
- All Weather Road
- Seasonal Road
- Trail
- Railroad
- County Boundary
- SYU Boundary

- Recreation Area BLM
- Recreation Area Other
- Mine or Quarry
- Church
- School
- (1-12) Timber Sale by Year (App. B)

T. 18 S.
T. 19 S.
T. 20 S.
T. 21 S.
T. 22 S.
T. 23 S.
T. 24 S.

T. 23 S.

T. 24 S.

T. 25 S.

T. 26 S.

T. 27 S.

T. 28 S.

T. 29 S.

T. 29½ S.

R. 14 W.

R. 13 W.

R. 12 W.

R. 11 W.

R. 10 W.

R. 9 W.

R. 8 W.

R. 7 W.

R. 7½ W.

☆GPO 1980 699-357